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26 January 1981

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 79

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AGREEMENT BETWEEN FRANCE, BRAZIL ON PEACEFUL USE OF URANIUM

PY080200 Rio de Janeiro JORNAL DO BRASIL in Portuguese 7 Jan 81 p 15

[Text] In a brief ceremony held yesterday, during which the French ambassador made some good-humored remarks, Brazil and France assumed the commitment not to use the uranium hexafluoride to be manufactured in the plant that will be set up in Resende, Rio de Janeiro State, for building nuclear weapons or for any other military application. The commitment was made through contracts signed between Nuclebras and the Pechiney Ugine Kuhlman-Upuk uranium company.

Ambassador Beliard humbly confessed that the first time he received instructions from Paris to negotiate the building of a yellow cake conversion plant in Brazil he had no idea of the meaning of some technical terms, only vaguely recalling that the word "hexafluoride could have its root in the Greek language he studied in college."

Under the terms of the notes that were formally exchanged yesterday between the French ambassador and the Brazilian foreign minister at Itamaraty, the two governments committed themselves not to use the uranium hexafluoride manufactured in France and exported to Brazil for building nuclear weapons or any nuclear explosive device or any other military application. The same commitment is binding for the uranium hexafluoride to be produced in the plant that will be erected in Resende, as well as for nuclear material or special fissionable material which could be obtained from the uranium hexafluoride imported from France or produced in Brazil.

CSO: 5100

FRANCE, AUSTRALIA SIGN NUCLEAR TRANSFERS AGREEMENT

LD091621 Paris LE MONDE in French 9 Jan 81 p 7

[Text] An agreement on nuclear transfers between France and Australia, the result of lengthy negotiations, was signed in Paris on Wednesday 7 January by Mr Rowland, Australian ambassador to France, and Mr de Leusse, secretary general of the French Foreign Ministry.

"This agreement," a Quai d'Orsay communique notes, "sets the condition which will apply to transfers of nuclear material equipment and technology between the two countries. It envisages as the most important thing that items thus transferred will be subject, in their countries of destination, to International Atomic Energy Agency guarantees and controls of peaceful utilization.

"The agreement allows each country," the communique goes on, "to undertake reprocessing of nuclear fuels based on uranium from the other country. That means in particular that France will be able to use plutonium produced from uranium of Australian origin in its nuclear power program."

This agreement is the culmination of very long negotiations, which were complicated by the position occupied by the Australian Government until recently as regards nonproliferation. In effect, Canberra was adhering to positions close to Washington's and was reluctant to accept clauses--like those eventually incorporated in the Franco-Australian agreement--giving the purchasers of Australian uranium complete freedom of utilization, particularly as regards reprocessing. On 27 November, the Australian Government officially announced a softening of its position. The Franco-Australian agreement should make it possible to break the deadlock at several sets of negotiations underway between French and Australian groups.

CSO: 5100

BRIEFS

AUSTRALIA-FRANCE ACCORD--The acting Australian Prime Minister, Mr Anthony, says the Nuclear energy agreement signed in Paris yesterday between Australia and France will allow the federal government to go ahead with new uranium projects. The agreement sets out guidelines for French imports of Australian uranium and Australian imports of French nuclear technology. Mr Anthony said the agreement meant that uranium mining and exporting had what he called come of age, and was now a fact of life in Australia. He said he expected more countries to seek Australian uranium to meet their essential energy needs. Radio Australia's European correspondent Malcolm Downing says Australia's nuclear agreement with France is expected to be followed soon by one with the European Economic Community's atomic energy agency Euratom. [Text] [OW081306 Melbourne Overseas Service in English 1230 GMT 8 Jan 81]

CSO: 5100

GANDHI TALKS TO HOUSE ON NUCLEAR DEVELOPMENTS

New Delhi PATRIOT in English 4 Dec 80 p 5

[Text] The second unit of the Rajasthan Atomic Power station is expected to start commercial operation only by the end of March 1981, Prime Minister Indira Gandhi told the Lok Sabha on Wednesday, reports PTI.

In reply to questions she said that unit-II is still being test run and is therefore being operated at a lower power level.

It is presently generating around 1.78 million units per day. Unit-I is generating 4.5 million units.

Mrs Gandhi said the unit-I of Madras Atomic Power project is expected to be completed in 1981 and unit-II in 1983.

The schedules for completion laid down at the time of sanction of the project were 1973 and 1976 for unit one and unit two respectively.

The delay has been mainly due to the embargo placed by certain countries on the export of certain equipment, and problems faced in indigenous design and fabricating critical equipment, Mrs Gandhi said.

Bhabha Centre

She agreed with Dr Karan Singh that the Bhabha Atomic Research Centre should have a full time director.

There were certain difficulties in this respect which, she said, would be solved soon.

At present Dr Sethana was looking after the affairs of the centre, she added.

She said eight scientists of Indian origin residing abroad will visit India for some time to provide specific technical inputs for development in priority areas.

Replying to a question by Mr R K Mhalgi, she said that the particulars of about 300 'expatriate volunteers' had been examined by a sub-committee constituted for the purpose.

The Prime Minister said that the scientists were invited under a project on 'Transfer of Know-How through Expatriate Specialists of India Origin' between the Government of India and the United Nations Development Programme.

CSO: 5100

GANDHI ANSWERS QUESTIONS ON HEAVY WATER PLANTS

Bombay THE TIMES OF INDIA in English 5 Dec 80 p 9

[Text] New Delhi, December 4:

The Prime Minister, Mrs. Indira Gandhi, came to the rescue of Mr. C. P. N. Singh, minister of state for science and technology, in the Rajya Sabha today during question-hour when the latter was facing heavy weather on the issue of heavy water.

Finding that Mr. K. C. Pant, (Cong-U), was thoroughly dissatisfied with Mr. Singh over a reply on the demand and availability of heavy water in the country, Mrs. Gandhi rose to inform the house that India would be fully self-sufficient in this commodity when the existing and proposed heavy water plants were fully commissioned. The former energy minister who expressed his "amazement" at Mr. Singh's reply on capacity and production of heavy water, joined the laughter with the rest of the house after Mrs. Gandhi's intervention.

The Prime Minister stated that there were some snags which had held up the completion of these projects. Once these snags were removed and the plants began functioning fully, there would be no deficit of heavy water.

Mr. Pant had taken umbrage at Mr. Singh's reply that he could not disclose the figures on heavy water production as it was not in the public interest to do so. All these figures were published in the annual report of the ministry and there was nothing secret about it, Mr. Pant pointed out.

Mrs. Gandhi said that although figures might have been published, the government would not like to officially give statistics on the subject. Mr. Pant's contention was that since heavy water was at important input into the nuclear power programme, it would be in the national interest to state the present situation in terms of demand and availability. [as published]

Mr. Singh earlier stated that considering the requirements of the country, the government did not envisage the export of heavy water. He was replying to the main question by Mr. Bishamber Nath Pande and Dr. Lokesh Chandra (both Cong-I). The heavy water plants at Nangal, Baroda and Tuticorin were already in operation while pre-commissioning activities had commenced at the Talcher and Kota plants. Talcher would go into production by mid-81 subject to the availability of gas from the associated fertiliser plant.

Mrs. Gandhi informed the house that India has received 241 tonnes of heavy water so far from the Soviet Union under a contract signed in September, 1976.

Inspection Facilities

Replying to Mr. Jaswant Singh, who wanted to know whether the Soviet Union had demanded and the government had conceded certain inspection facilities, she said the application of safeguards in connection with the supply of heavy water under the 1976 agreement was governed by the bilateral safeguards agreement entered into by India with international atomic energy agency in 1977.

Replying to Mr. N. N. Reddy, the Prime Minister said the nuclear fuel complex, Hyderabad, was in the process of being expanded at an estimated cost of Rs. 13.06 crores from its present capacity to manufacture 100 tonnes of finished fuel per year to 210 tonnes of finished fuel per year to meet the requirements of the heavy water reactor programme.

Under the co-operation agreement of 1963, the U.S. government was obliged to make available enriched uranium for use as fuel at the Tarapur atomic power station on a timely basis and India was correspondingly precluded from operating the Tarapur reactors on any other fuel.

In reply to Mr. Shahabuddin (JP) the Prime Minister gave details of the mandays lost due to break down in unit one of the Rajasthan atomic power station since the commencment of commercial operation. They are as follows: 1974 (days lost 70) 1975 (41) 1976 (127) 1977 (45) 1978 (38) 1979 (64) 1980 till November 20 (89).

She said Unit II of the station was yet to go into commercial operation. Each of the two units of the Rajasthan Atomic Power Station had a rated gross output of 220 MWE.

She said reasons for the breakdown and shortfall generally had been grid problems, equipment failure, human error, labour unrest and strike.

CSO: 5100

NARORA PROJECT TO START IN 1985

Karachi MORNING NEWS in English 22 Dec 80 p 3

[Text] New Delhi, Dec 21: Indian atomic power projects at Narora are likely to become operative by 1985 when the two units of the project will take off.

The project, situated on the River Ganges in the northern state of Uttar Pradesh consists of two pressurized heavy water reactor units each of 235 mwc Uttar Pradesh, consists of two pressurized heavy water reactor units each of 235 mwc (gross) capacity. The reactor units are basically similar to those at Madras and Rajasthan projects. The station design is also adopted to suit the sesmic conditions at the site. [as published]

The authorities working on the site say that there is no safety hazard. Some scientists are arguing to stop the work at the project because of the danger of earthquake.

Authorities working on the project said that all the conditions are basically considered by the experts in this field.

The sanctioned cost of the project is 262.36 million dollars. The foreign exchange component is expected to be about 10 per cent of the total costs.--PPI

CSO: 5100

INDIA

BRIEFS

NEW SPECTROPHOTOMETER DEVELOPED--New Delhi, Dec 7--The National Physical Laboratory (NPL) here has designed and developed a single-beam photoacoustic spectrophotometer, which gives complete optical absorption spectrum of various materials by exposing their samples to intermittent (chopped) mono-chromatic light in a specially designed airtight cell equipped with a sensitive microphone. According to a CSIR press release, the instrument possesses high detectivity and is highly sensitive. It can obtain the absorption spectra of a wide variety of materials. Photoacoustic spectrophotometer has potential applications in non-destructive material characterisation, surface studies, de-excitation studies, very low level detection of air pollutants and liquid impurityes, spectral measurements of very weak absorptions, quick calibration and spectral distribution determination of radiation sources.--Our Special Correspondent. [Text] [Madras THE HINDU in English 8 Dec 80 p 7]

FIRST NIOBIUM PRODUCTION--Niobium, a vital metal used in nuclear reactors, will be produced for the first time in the country. A pyrochlore concentration plant will be set up in Sung valley in Jantia hills district of Meghalaya to produce the metal. About 1,000 kilogramms of Niobium concentrate is expected to be produced in a year. [Text] [BK081511 Delhi Domestic Service in English 0830 GMT 8 Jan 81]

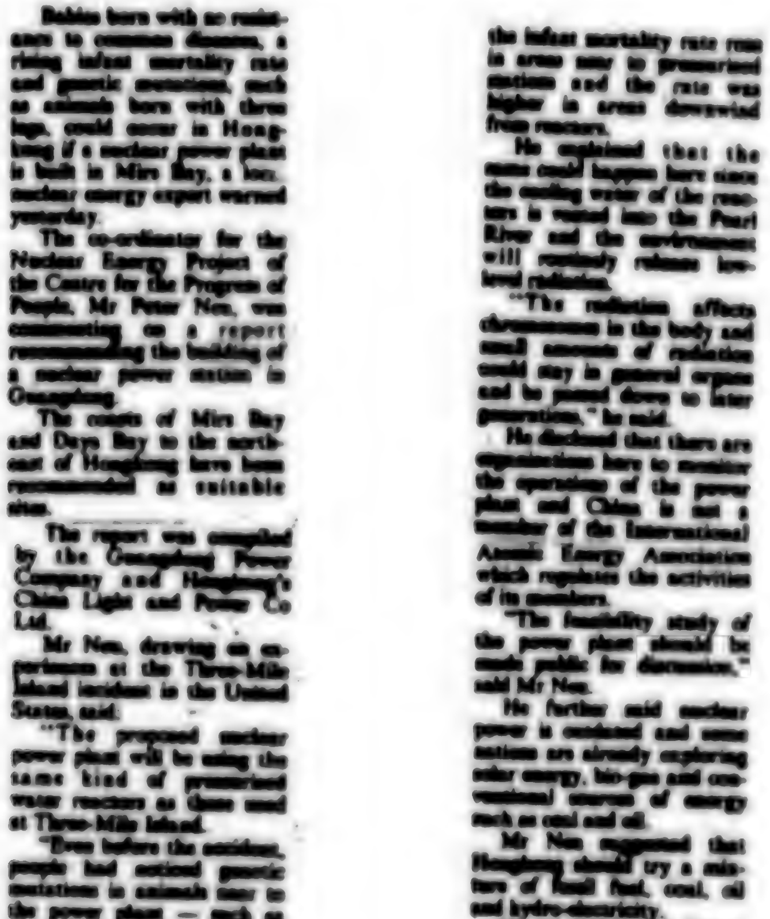
HEAVY WATER PRODUCTION INCREASED--Experimental production of heavy water has started at the newly-constructed plant near Kota in Rajasthan. It will produce 100 tons of heavy water when it assumes full capacity. Meanwhile Mr N. Srinivasan, director of the heavy water projects of the Atomic Energy Commission, said in Baroda yesterday that the total production of heavy water is expected to go up to 13,000 tons over the next 2 decades. He said that it is proposed to set up seven more heavy water plants beside those already proposed—one at Thal in Maharashtra, the second in Hazira in Gujarat, and another near a coal mine. Mr Srinivasan said that the initial problem faced by the Baroda plant had been overcome by the efforts of Indian scientists and technicians. The plant is now operating satisfactorily. [Text] [BK060800 Delhi Domestic Service in English 0240 GMT 6 Jan 81]

CSO: 5100

NUCLEAR PLANT DANGERS DESCRIBED

Hong Kong SOUTH CHINA MORNING POST in English 13 Dec 80 p 1

[Text]



Babies born with no resistance to common diseases, a rising infant mortality rate and genetic mutations, such as animals born with three legs, could occur in Hongkong if a nuclear power plant is built in Mirs Bay, a local nuclear energy expert warned yesterday.

The co-ordinator for the Nuclear Energy Project of the Centre for the Progress of People, Mr Peter Neo, was commenting on a report recommending the building of a nuclear power station in Guangdong.

The coasts of Mirs Bay and Daya Bay to the north-east of Hongkong have been recommended as suitable sites.

The report was compiled by the Guangdong Power Company and Hongkong's China Light and Power Co Ltd.

Mr Neo, drawing on experiences at the Three-Mile Island incident in the United States said:

"The proposed nuclear power plant will be using the same kind of pressurised water reactors as those used at Three-Mile Island.

"Even before the accident, people had noticed genetic mutations in animals near to the power plant — such as sheep and goats born with three legs and chicken eggs with soft shells."

He said studies in the United States had shown that the infant mortality rate rose in areas near to pressurised stations and the rate was higher in areas downwind from reactors.

He explained that the same could happen here since the cooling water of the reactors is vented into the Pearl River and the environment will constantly release low-level radiation.

"The radiation affects chromosomes in the body and small amounts of radiation could stay in general organs and be passed down to later generations," he said.

He disclosed that there are organisations here to monitor the operations of the power plant and China is not a member of the International Atomic Energy Association which regulates the activities of its members.

"The feasibility study of the power plant should be made public for discussion," said Mr Neo.

He further said nuclear power is outdated and some nations are already exploring solar energy, bio-gas and conventional sources of energy such as coal and oil.

Mr Neo suggested that Hongkong should try a mixture of fossil fuel, coal, oil and hydro-electricity.

He also suggested Hongkong should explore bio-gas, a technology which is "internationally acknowledged as being most advanced in China."

CSO: 5100

NUCLEAR POWER STATION ALMOST CERTAINTY

Hong Kong SOUTH CHINA MORNING POST in English 12 Dec 80 p 1

[Text] Building of a nuclear power station in Guangdong province became almost a certainty yesterday with the ceremonial signing of a joint feasibility study report in Canton.

The report--the work of the Guangdong Power Co and Hongkong's China Light and Power Co Ltd--recommends the building of a nuclear power station containing two units of about 900 megawatts each.

The nuclear-generated 1,800 megawatts will almost double the power generating capacity of the province but falls far short of Hongkong's non-nuclear capacity, which will reach approximately 4,600 megawatts when current installation work is completed.

The report says "suitable sites which meet all safety and technical requirements have been found along the coasts of Mirs Bay and Daya Bay, both located northeast of Hongkong."

Signing the report in Canton yesterday was Mr Shih Chao-hsiang, general manager of the Guangdong Power Co and Sir Lawrence Kadoorie, chairman of China Light.

The report recommends the establishment of a joint venture company between the two companies "in association with Hongkong and other interests to develop, manage, operate and own the proposed nuclear power station."

A statement issued by China Light says that if the project starts next year, the two 900 mw units can be in commercial operation in 1988 and 1989 respectively and the joint venture will continue to 2009.

The most suitable type of reactor for the power station, according to the report's recommendations, would be a pressurised water reactor.

The joint feasibility study was started in November last year and covered a wide range of aspects with emphasis on safety, economics and technology.

The study was divided into four groups: site selection, economics, equipment and system design.

Mr Shih and Sir Lawrence acted as joint chairmen of the executive committee to oversee all facets of the study.

The report concludes that a nuclear power station in Guangdong is feasible and will benefit--and supply--both Guangdong and Hongkong.

The report is now to be submitted to the governments of Guangdong, China, Hongkong and Britain for consideration.

CSO: 5100

BRIEFS

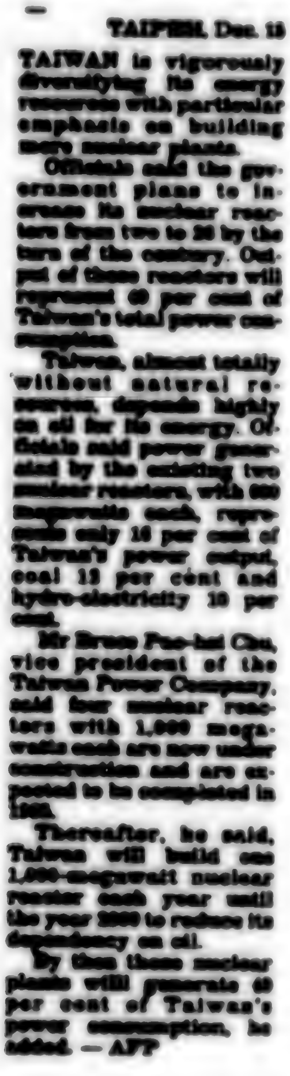
URANIUM DEPOSITS FOUND--Colombo, 17 Dec--Sri Lanka has rich uranium deposits in five coastal areas, a spokesman for the Geological Survey Department said today. The Department's Director, DAAC Hapuarachchi said positive indications of the presence of uranium were found in five areas in the northwest, east and the south during a year-long survey of the 25,000-square-mile island. A detailed eight-month survey, scheduled to start next month, will determine the quantity and quality of the deposits and the economic feasibility of mining them, he said. [Text] [Rangoon THE WORKING PEOPLE'S DAILY in English 19 Dec 80 p 6]

CSO: 5100

PLANS FOR 26 NUCLEAR REACTORS BY YEAR 2000

Kuala Lumpur BUSINESS TIMES in English 16 Dec 80 p 3

[Text]



TAIPEH, Dec. 15

TAIWAN is vigorously diversifying its energy resources with particular emphasis on building more nuclear plants.

Officials said the government plans to increase its nuclear reactors from two to 26 by the turn of the century. Output of these reactors will represent 40 per cent of Taiwan's total power consumption.

Taiwan, almost totally without natural resources, depends highly on oil for its energy. Officials said power generated by the existing two nuclear reactors, with 600 megawatts each, represents only 16 per cent of Taiwan's power output, coal 13 per cent and hydro-electricity 10 per cent.

Mr Bruce Pao-hsi Chu, vice president of the Taiwan Power Company, said four nuclear reactors with 1,000 megawatts each are now under construction and are expected to be completed in 1985.

Thereafter, he said, Taiwan will build one 1,000-megawatt nuclear reactor each year until the year 2000 to reduce its dependency on oil.

By then these nuclear plants will generate 40 per cent of Taiwan's power consumption, he added. — AFP

CSO: 5100

TAIWAN

SECOND NUCLEAR POWERPLANT GETS URANIUM FUEL

OW061259 Taipei CNA in English 0934 GMT 6 Jan 81

[Text] Taipei, 6 Jan (CNA)--Installation of uranium fuel in the first power generator of the Taiwan Power Company's [Taipower's] second nuclear power plant started Monday, 115 days ahead of schedule.

A spokesman for the state-owned company said the nuclear reactor, with a core of uranium, is expected to begin commercial operations by the end of June, further boosting Taipower's installed capacity in the face of increasing pressure from energy shortages.

Construction of the nuclear power station started in November 1975 and took less than 62 months before the uranium filling, the spokesman said, adding the period in between is more than 16 months shorter than the time spent on a reactor of the similar type in the United States.

The shortened construction time has resulted from cancellation of holidays over the past years to complete the nuclear power generator at an earlier date to relieve Taipower's heavy dependence on oil to feed the thermal power plants, the spokesman pointed out.

Taipower's second nuclear power plant, like the first one, will have two nuclear power generators. The spokesman said the second nuclear (?generator) was 81.6 percent completed as of the end of November 1980, and will start uranium filling within this year.

The two nuclear power generators of the second nuclear power plant are expected to save Taipower an estimated U.S. $800 million annually in oil bills, the spokesman said.

CSO: 5100

MORE SURVEYS TO BE DONE ON KHON KAEN URANIUM FIND

Bangkok DAO SIAM in Thai 23 Nov 80 p 16

[Article: "Nuclear Fuel Minerals Found In Thailand In Khon Kaen"]

[Text] Mr Prawit Ruyaphon, the secretary general of the Natioal Energy Administration, has revealed that deposits of minerals that can be used as nuclear fuel, that is, uranium and thorium, have been found in Thailand. As for uranium, this has been discovered in sandstone in Phuwieng District, Khon Kaen Province. This discovery of approximately 23 tons of uranium happened by chance while surveying for copper. Following this, the Department of Mineral Resources conducted physical and geochemical studies in the Northeast and it appears that the rock structure is similar to that in Phuwieng District. This is in an area more than 100,000 square kilometers in size and it is expected that there is uranium here too. As for thorium, which occurs in monazite, monazite is usually found in the waste ore of tin mines in the southern provinces. Approximately 6,400 tons of monazite have been obtained from the waste ore and 4 percent is thorium oxide. Thorium has also been obtained from the monazite found in the beach sand at approximately 200 excavation pits in the southern provinces; 1.1 to 15 percent [of the monazite] is thorium oxide.

The secretary general of the National Energy Administration stated that, because it is still not known where all the nuclear mineral deposits are or how large the deposits are, plans should be made to survey the nuclear minerals in order to have more definite knowledge. Also, assessments should be made of their suitability for production, of the technology and of their suitability for use as a fuel, espcially for use as a fuel in the production of electricity. In accord with the plans that have already been made, aerial surveys will be made using geophysical methods in order to measure the amount of radioactivity and find areas having high levels of radioactivity. When these data are taken into consideration along with the geological and other data, it will be possible to estimate which areas contain nuclear minerals. The goal of the plan is to conduct the surveys in order to reliably estimate the size of the mineral reserves within the 100,000 square kilometer area in the northeast which has geological characteristics similar to those in the Phuwieng area where uranium has been found. Concerning the surveys to determine the definite locations of the mineral deposits, efforts will be made to complete the surveys within 5 years in accord with the plans drawn up by the National Energy Administration to accelerate the development of alternate forms of fuel oil.

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CSO: 5100

BRIEFS

NEW NUCLEAR TECHNOLOGY PLANT--The recently constructed Research Production Plant of the Institute of Radioecology and Utilization of Nuclear Technology (Vyzkumne vyrobni zavod Ustavu radioekologie a vyuziti jaderne techniky) in Spisska Nova Ves is the only CSSR establishment specializing in production of a typical apparatus and equipment for the nuclear industry. [Prague LIDOVA DEMOKRACIE in Czech 30 Dec 80 p 4]

CSO: 5100

CASTRO MADERO ANNOUNCES CONSTRUCTION DATE FOR NEW PLANT

Buenos Aires CLARIN in Spanish 15 Nov 80 p 10

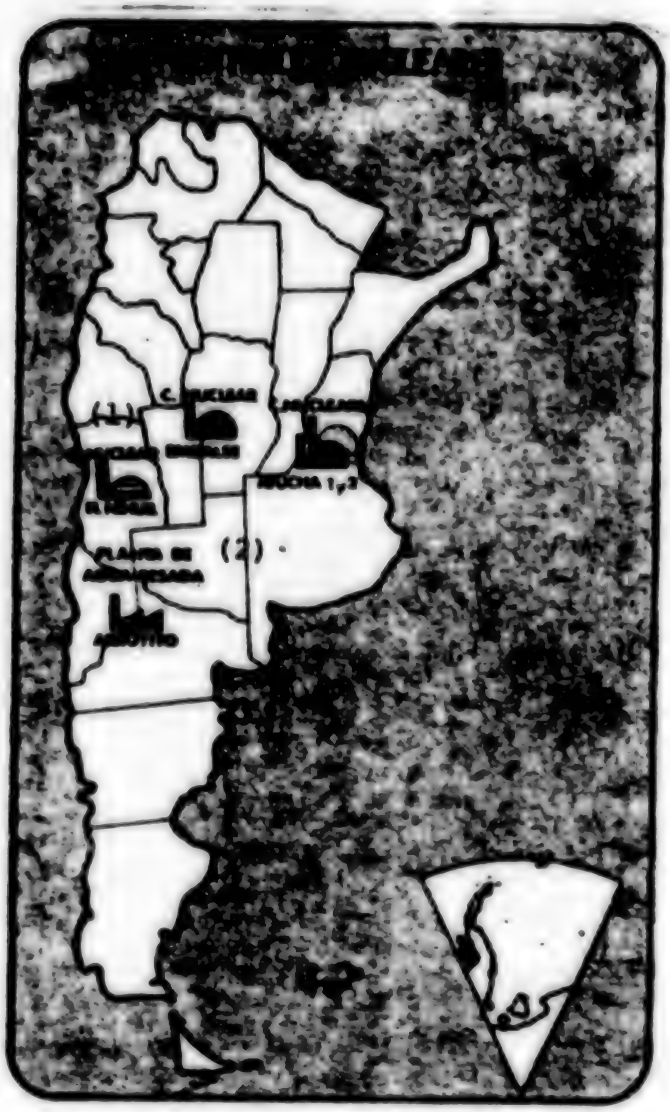
[Text] The head of the CNEA [National Atomic Energy Commission] has announced that Argentina's national energy goal is to have, by the year 2000, 15 percent of all the energy produced in Argentina come from nuclear energy. Vice Admiral Carlos Castro Madero also said that the next atomic power plant is to be located at El Nihuil in Mendoza (see map), and if everything goes as expected, "work should begin in 1983."

The official, who was giving a speech in Mendoza yesterday, pointed out that Argentina took a "fundamental step forward in creating a long-term nuclear policy" when it established a program to build four 600-megawatt nuclear power plants that will use natural uranium and will be moderated by heavy water.

Bonuses

He then spoke about the need to encourage the exploitation of Argentina's uranium deposits, saying that as a stimulus for the provinces which have uranium mines, Mendoza will be given uranium bonuses amounting to over 3.3 percent of the international price of enriched uranium. "We can say," he added, "that the initial offer of 3.3 percent of the international price of enriched uranium has been improved."

The uranium bonuses are based on the international price of the enriched uranium ore, that is, on a product and not on the ore itself; as a result, they are independent of the content of the deposits existing in the provinces. Castro Madero added that this is a step designed to promote the development of this resource, even in low-grade deposits.



The map shows the approximate location of the El Nihuil plant, where construction is scheduled to begin in 1983.

1. Nuclear power plants
2. Heavy water plant

Background

The nuclear plan calls for the construction of four nuclear power plants by 1997. The first of these is Atucha II, for which a contract has been awarded to Siemens. This plant is to follow Atucha I and the Embalse plant, now under construction.

Bidding is now scheduled for the next plant at El Nihuil, Mendoza, where construction should begin in 1983.

The Argentine program also includes the construction of complementary plants, such as the heavy water plant in Arroyito, Neuquen, whose construction and start of service have been declared to be in the national interest.

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CSO: 5100

ARGENTINA

COLUMNIST REPORTS ON EMBALSE NUCLEAR PLANT PROGRESS

Buenos Aires LA NACION in Spanish 7 Dec 80 p 24

[Article by Santiago Ferrari]

[Text] Cordoba--Construction is moving along, despite all the difficulties. This is a huge castle under construction, which delves down under the soil just as it rises above the soil. The visitor would hardly notice this, except for the soles of his shoes, which go up and down countless steps, on one stairway after another, from floor to floor, while the visitor's head tries to understand a little of what is going on before his eyes. He sees people who have been drawn there from all over, with long hair sticking out from under their hard hats above their tanned faces with high cheekbones, and he hears sounds of all sorts, from resounding crashes to the humming and moaning of machinery in action. For this is a factory that is being built and it has to have all this and much more, resembling so many factories that have been seen all over the world. But here there is something special, something Dantesque, that is vaguely sensed, especially when entering the future security hall. This is a large "cell" with a huge sliding wall that in case of emergency will have to protect the personnel. There are all the control and communications devices. "We hope we will never have to use it," says an engineer. But it has to be there. Precautions are painstaking, just as in a space ship. But just as in any large project, human foresight can not be expected to be 100 percent infallible. And even if it were, just the name of "atomic energy" has a somewhat sinister connotation. So it seems appropriate that the visitor should feel that he has entered a strange world, even though the engineers and workers feel at home there.

Its Raison d'Etre

Nothing is easier than to define what an atomic reactor is: the hard part is to understand the physical phenomena behind its operation. This reactor is a steam machine used to produce electricity. The steam will operate generators, as in an ordinary electric power plant, but the heat needed to obtain this steam will not come from petroleum or from oil, but from another "fuel," uranium. Coal burns; uranium operates by the fission process. Fission is the division of the nucleus.

A number of the world's powerful countries are already using atomic fuel; they have petroleum and coal in abundance, but they want to take precautions for their future needs. Furthermore, petroleum is used for so many things of incalculable value that, as the economists say, "It is too valuable to be burned." When the use of atomic energy is well developed and standardized, it will be more economical than the use of other fuels, but naturally its beginning stages are difficult and because of the nature of the nuclear phenomenon, they demand greater scientific preparation than anything done to date. The engineer Diaz, the project manager, explained to us the process of uranium fission, drawing sketches on a chalkboard, using different-colored markers. While we didn't understand everything, he did clear up some fundamental points for us. He also told us that this is the second atomic plant in the nation. The first was Atucha, which is now operating very well. He explained to us the differences between the Atucha reactor and the Embalse reactor: they do not lie solely in the capacity (the Embalse reactor has twice the power), but also in the reactor system itself.

The Origin

The plant that we are visiting is a national plant, as it belongs to the CNEA [National Atomic Energy Commission]. This organization runs all of Argentina's atomic program and is under the office of the president of the republic.

But this national plant is also Cordoban, not only because of its location but also because of its purpose and in part, its origin. This was the province which in 1967 got the CNEA to agree to a study of the feasibility of building a nuclear-electric power plant of 150 megawatts in the Los Molinos dam.

Before the study was completed, the national plan of creating an interconnected electric power supply system for the entire nation took shape. One hundred and fifty megawatts had been a small amount even for the Cordoban parc. Atucha, which was now under construction, produced 319 megawatts. For Cordoba it was decided to build a 600-megawatt or more power plant. For a number of reasons, another location was selected: instead of Los Molinos, Embalse.

The German firm that had built Atucha also bid on this project. But because of the difficulty of doubling the capacity of the reactor container built for Atucha, the German project called for two containers. It was decided to choose the Canadian project that used a different type of reactor called the Candu. Contracts were signed with Atomic Energy of Canada and with Italimpianti, and work began.

List of Troubles

The friend who guided me around on this Dantesque trip (every Dante has his Virgil) sighed as he recalled the construction problems which he called "troubles."

There are always delays in any major public project, whether in this hemisphere or in the other. But when we are dealing with atomic energy, the problems arise in different areas, and many are of international origin. By cutting the full explanation he gave us down to a minimum, the troubles were more or less the following:

1. Despite being the second plant in the program, it was as if it were the first. For Atucha had been contracted as a "ready for use" project. This means that the foreign manufacturer does the work and delivers the completed project. We receive it and use it like a person who buys and uses a truck. He knows how to drive it and to some extent how to repair it, but he doesn't know how it is built. The ideal is for the foreign manufacturer to have us work along with him. That was a stipulation for the Embalse plant.

2. After the contract was awarded in 1973, the usual safeguard negotiations began in 1974. Safeguards for what? That the future reactor and the technology transferred will only be used for peaceful purposes.

Argentina is one of the countries which, for reasons that we will see later, has refused to sign the treaty on nonproliferation of nuclear weapons. But it does belong to the International Atomic Energy Organization, and it is prepared to allow inspections of everything it receives from abroad. Inspections of what it produces without anyone's aid, by itself, are another matter. Furthermore, it does not seek aid from this organization.

3. Despite all that, negotiations were going well, when India exploded its atom bomb. The Canadians who had provided the aid needed to build India's reactor protested. There was a national and international protest. It was then decided to impose stricter controls on Argentina.

4. After this came the world petroleum crisis, leading to such cost increases that the Canadians lost huge amounts of money, and in 1976 they threatened to abandon the project.

The terms of the contract had to be revised. More losses, according to the Argentines, were caused by the Canadians themselves.

5. A solution was found. (And we will leave aside the parliamentary investigation that was conducted in Ottawa, with the revelations arising from it). The technical-economic solution was for Argentina to act as the primary subcontractor. The Canadians would keep their responsibility to facilitate the basic engineering to complete and plant and would guarantee its functioning.

And that is how, in this visit, we came into contact with this project, which has advanced very much from what we saw last year. But all of the Argentine atomic program is now well advanced, and this was a good opportunity to take a look at it.

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BRIEFS

NUCLEAR INDEPENDENCE--Cordoba--"The fear of nuclear proliferation has to some extent been exaggerated and has imposed the well known limitations that are going to lead many countries to try to be totally independent of foreign markets. It is quite possible that Argentina will be one of these countries," said Dr Sigvard Eklund, director of the International Nuclear Energy Organization, who, along with other nuclear experts, was visiting the Embalse Nuclear Power Plant site. Eklund felt that the decision of a number of countries to sign the nonproliferation treaty was "a great victory," but he said that some countries which are very advanced in nuclear technology, and which have promised to give assistance to others, "have not kept their promises." On the subject of the Argentine nuclear plan, he said that "it is very well designed and is quite realistic. It is hard to find in one country such an integral program that covers the various aspects of nuclear energy." Once, referring to information from qualified sources from the Embalse management, he said that the supply of natural uranium and heavy water for the operation of the nuclear plant has been assured for its first period. This means an availability of 1 and 1/2 years from the time when it begins to operate. This will happen at the end of 1982 or the beginning of 1983. [Text] [Buenos Aires LA NACION in Spanish 11 Dec 80 p 20] 7679

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BRAZIL

BATISTA DEFENDS NUCLEAR PROGRAM BEFORE CPI

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 23 Nov 80 Sec 8 p 157

[Text] In a special article for O ESTADO, the president of the Brazilian Nuclear Corporation (NUCLEBRAS), Paulo Nogueira Batista, summarizes the main points of his testimony before the Senate Investigating Committee (CPI) on the nuclear agreement, in which he defends the Brazilian program "against the emotional critics who do not have an overall view of the issue." He gives a short history of the use of nuclear energy for peaceful purposes, shows the reasons that led Brazil not to subscribe to the Nuclear Nonproliferation Treaty and defends the cooperation agreement with Germany. The ambassador argues that the increased available hydroelectric potential in the Southeast region will be exhausted before the end of the decade and that the proposal to abandon the Brazilian nuclear program or to slow it down "does not make sense because 10 years before the water resources are exhausted, beginning in 1992, we would suddenly and simultaneously have to begin installing 10,000 MW per year, almost all of it nuclear." Paulo Nogueira Batista declared also that nuclear plants, which are now more expensive to build than the hydroelectric plants, can be competitive with the hydroelectric plants that are still going to be built to go into operation at end of the decade. Finally, the president of NUCLEBRAS guarantees the "peaceful intentions of our nuclear policy."

The Limits of Water Resources

I propose to try to correct what seems to me to be a perverse tendency in the nuclear debate in our country: the loss of the overall view through the prevalence of sectorial viewpoints. Not to mention, of course, the emotionalism that distorts the view of many of the critics.

The Legislative Branch has known how to contribute to clarifying the major questions. That is especially true in the nuclear case. From the first Congressional Investigating Committee in the fifties, the reporter of which was the then Deputy Dagoberto Salles, clearly emerged the principle, later embodied into law, of the requirement for specific "technological counterparts" for the export of nuclear ores.

The conclusions of the congressional investigating committee, embodied in the report of the then Deputy Aureliano Chaves de Mendonca, demonstrate the need for Brazil to engage progressively and intensively in a program of nucleoelectric energy generation.

Over the years, therefore, with the active participation of the national congress and parallel with the consolidation of nuclear technology in the world, a broad consensus began to be formed in Brazil regarding the basic question: the need for the country to utilize nuclear energy as a source for the generation of electric energy.

Participation

In my capacity as a career diplomat, I had the opportunity to participate also in the formation of that consensus and to contribute in the Foreign Ministry to the establishment of a position which I deem to be fundamental: the defense in international forums of the full and unrestricted access of Brazil to nuclear technology for peaceful purposes.

The national congress gave broad support to the international positions of the executive, specifically confirming the position adopted by the government with regard to the Treaty of Nonproliferation of Nuclear Weapons in Latin America (1967) and the Nuclear Nonproliferation Treaty (1968-70).

The utilization of nuclear energy for peaceful purposes emerged as the byproduct of its uses for military purposes. Its original sin was the release of huge quantities of energy contained in the atom on the defenseless populations of Hiroshima and Nagasaki. The "Manhattan Project" to build the atomic bomb itself already anticipated the major guidelines of the policy that would be practiced by the United States in the post-war period: a one-way cooperation in which all countries in a position to cooperate with technology or raw materials would be invited to do so without receiving the counterpart of access to the results obtained from the utilization of the new form of energy.

From 1946 to 1953, U.S. policy was based on the total denial of cooperation, even for civilian purposes. What was proposed in the so-called "Baruch Plan" in 1946 was the internationalization of all nuclear activities, even uranium mines, which, under the aegis of an international agency, would come under the de facto control of the United States.

With the breaking of the U.S. monopoly of nuclear weapons by the USSR and later by Great Britain, the U.S. position became flexible. In 1953 it initiated the "Atoms for Peace" policy, which limited cooperation to supplying only research or power reactors, and even so under a system of international safeguards. In practice, the "Atoms for Peace" policy led to a policy completely oriented toward a dependence of knowledge and materials, inhibiting initiatives of independent development.

Tensions within the socialist world and the Western world--resulting from the decision of China and France to acquire nuclear weapons by national means--were to lead to a gradual approximation of viewpoints between the USSR and the United States from which would emerge the 1963 Moscow Treaty banning nuclear tests except underground, and the 1968-70 Nuclear Nonproliferation Treaty (NPT). Under this multilateral document, the countries not possessing nuclear weapons were invited to renounce those weapons in exchange for undefined promises of nuclear disarmament by the superpowers and of assistance for the peaceful use of nuclear energy.

Brazil did not subscribe to the NPT because it considered it discriminatory, restrictive of access to nuclear energy for peaceful purposes and inadequate to promote the objective of nonproliferation of nuclear weapons, whether in a vertical sense, of nuclear disarmament, or in a horizontal sense, of preventing the increase of the number of countries possessing nuclear weapons.

Program

In 1974, the Brazilian Electric Power Company (ELECTROBRAS) submitted to the government a program of projects to meet the needs of the electricity market for the period 1975-1990. The so-called Plan-90, based on the expectation of an increase of the demand for electricity at the average rate of 8.7 percent per year in case of a low market (which is not the case) or 11.4 percent in case of a high market (as is occurring) included, along the line of the Aureliano Chaves report of the second congressional investigating committee, the proposal to build from six to eight nucleoelectric plants and a hydroelectric potential estimated at 150,000 MW. The sites of the first two units had already been selected--Itaorna Beach in Angra dos Reis, near Angra-I--and their construction was supposed to begin immediately to go into operation in the first half of the 1980's. In that connection, as an indication of urgency, the respective concession was requested for Furnas in 1974, thus, even before the creation of NUCLEBRAS and of the conclusion of the nuclear agreement between Brazil and the Federal Republic of Germany.

Under the impact of the 1973 oil crisis and the vulnerability which foreign dependence for energy represented, President Ernesto Geisel decided on a broader and more intensive strategy, which included not only a program for nucleoelectric power plants but also all installations of the fuel cycle, with the acquisition of national know-how in process and project engineering of nuclear installations as well as the manufacture of components. With that objective, NUCLEBRAS was organized as the principal agency for implementation of the Brazilian nuclear program, by virtue of Law No 6,189 of 16 December 1974.

In the light of those facts, which are general knowledge, the bad faith is obvious of those who insist on ascribing to NUCLEBRAS, which did not exist at the time, responsibility for the proposal of a program of nuclear power plants against the wishes of ELETROBRAS, and, furthermore, responsibility for estimates that led the government into error because of the underestimation of the hydroelectric potential or the overestimation of the rate of increase of the consumption of electricity.

The need for a nucleoelectric program emphasized by ELECTROBRAS made it inevitable to consider seeking international cooperation. However, the government could not limit itself to permitting the electric power service concessionaires to purchase as a "black box" the nuclear plants recommended by ELECTROBRAS.

That basic policy eliminated at the outset direct negotiations with foreign private companies, particularly U.S. firms, traditional suppliers of the electric sector and of Angra-I. The contacts established with the United States even at the government level immediately demonstrated the impossibility of broad cooperation, particularly as regards the areas of the isotopic enrichment of uranium and the reprocessing of irradiated materials.

At the same time, through the joint action of the Foreign Ministry and the Ministry of Mines and Energy, contacts were established with France and with the Federal Republic of Germany, countries that also possessed all the technology pertaining to light water reactors and their respective fuel cycle. It was the effective application of the principle of "specific compensations: established by the first nuclear congressional investigating committee and embodied into law. Both countries showed themselves receptive to the Brazilian proposals. However, the German response was more expeditious than the French one, notwithstanding the latter's good will.

We thus come to the nuclear cooperation agreement with the Federal Republic of Germany.

In the context of international difficulties, it was imperative that negotiation of the agreement and its protocols be conducted in a secretive manner. The insistent and emphatic high-level representations vis-a-vis the German and Brazilian governments aimed at the suspension of the agreement--examples of which are the mission of Vice President Mondale to Bonn and the mission of Undersecretary of State Christopher to Brazil--fully confirmed the advisability of those precautions, which made impossible a prior public discussion of the terms of the agreement. Once the agreement was concluded, the Brazilian Government gave it the broadest disclosure in an ample file distributed at that time by the presidency of the republic. And it was promptly submitted to the consideration of the national congress, permitting a broad debate on the matter.

It is, therefore, difficult to understand why after the unanimous acceptance of the agreement by the national congress some dissenters should persist in criticizing the alleged dictatorial nature of the nuclear policy and the supposed bypassing of the legislative branch at that basic stage of the Brazilian nuclear program.

Potential

Taking as a basis the increase that has occurred in our hydroelectric potential, which went from the 150,000 MW at the time of the preparation of Plan-90 to 213,000 MW, according to the last estimate by ELECTROBRAS, some critics maintain that the Brazilian nuclear program has become unnecessary.

The new figures do not change the basic data of the problem. The increase of hydroelectric potential occurred basically in the Amazon Basin and in terms of estimated resources, therefore, it does not represent an increase in availability for use in the short term. The outlook of the Southeast region, with 70 percent of the Brazilian consumption of electricity and where the available potential will be exhausted before the end of the present decade, according to ELECTROBRAS, remain basically unaltered.

According to ELECTROBRAS also, it is not feasible to consider immediately the intensive use of the water resources of that region to benefit the Southeast region.

It is well to keep in mind that even assuming the possibility of the full utilization of the 213,000 MW potential, that full utilization would occur by the year 2003, according to the current forecast of growth of electric consumption adopted by ELECTROBRAS of an annual average rate of 10 percent during this decade and of 7.5 percent the following one.

The proposal to abandon the nuclear program or to slow it down to a rate that would compromise achievement of its objectives does not make sense even assuming the complete utilization of the hydroelectric potential on the horizon of this century. Because about 10 years before it is exhausted, beginning in 1992, we would suddenly and simultaneously have to begin installing 10,000 MW per year, almost all of it nuclear, to take care of the demand in 2004 and subsequent years.

Continuation of the Brazilian nuclear program does not compromise the unquestionable priority that has to be given in the short and medium terms to the construction of hydroelectric plants.

What does not make sense is to speak about priorities for hydroelectric projects for the generation of electricity as a synonym for exclusiveness in the distribution of funds for the electric sector. During the decade, the nuclear power plant program will represent less than 15 percent of the overall investment for the generation and transmission of electricity, which categorically demonstrates the real priority given by the government to the hydroelectric sector.

Nuclear Cost

Discussion of the problem of nuclear cost reveals the complete lack of justification of the criticism about the burden which the Brazilian nuclear program represents. The government and NUCLEBRAS never pretended that the nucleoelectric plants, especially Angra-II, bearing the additional burden of inexperience, would be cheaper than the hydroelectric plants already built or under construction. These plants are obviously the best available utilization. However, even among them there are examples, such as Balbina in the Amazon, of hydroelectric plants that in terms of an installed kilowat and especially medium power, already represent costs exceeding those of a nuclear plant. However, in an isolated small-scale system such as that of Manaus, Balbina represents the correct option.

What NUCLEBRAS maintains is that the nucleoelectric plants, which are now more expensive than the hydroelectric plants under construction, can be competitive with the hydroelectric plants to be begun and to go into operation at the end of this decade and the beginning of the 1990's. That will be the normal consequence of the tendency of the cost of a nuclear kilowatt to become stabilized and even to drop, with the acquisition of construction experience, in juxtaposition with the tendency of the cost per hydroelectric kilowatt to increase as a consequence of increased transmission costs as well as reduction of the scale of the projects.

Another important observation pertains to the manner in which the critics of the program deal with the overall costs of what they term, not without malice, the "millionaire agreement." The way the opponents describe it is as if the expenditures related to the construction of nuclear power stations represents a net increase above the investments for the generation of electricity. It does not occur to them to subtract the investments that presumably would not be made in hydroelectric plants that were in fact available for construction. In reality, the cost difference between the alternatives is what would represent the net increase. Actually, only in the short term, up to 1990, the nuclear program will mean a small net addition.

The direct cost of the nuclear power station program--10,000 MW by 1995--is budgeted, at today's prices, at $13.5 billion. In the period up to 1990 this investment will amount to $7 billion. According to ELECTROBRAS Plan-95, the forecast for direct investments in hydroelectric plants in the period 1980-90, for the installation of a 40,000 MW capacity, at the same prices, is $40.2 billion, including transmission. Comparing these figures, one can see that the average cost per installed kilowatt of nuclear and hydroelectric plants would be in the same order of magnitude and that in the period 1980-90 the so-called "millionaire" program will represent only 15 percent of the program of investments in generation plus the transmission of electricity.

Suffice it to recall that the total investment in the Brazilian nuclear program in 1981 represents only 1 percent of the overall expenditure of state enterprises and that the foreign debt contracted by NUCLEBRAS does not amount to 1 percent of the total Brazilian indebtedness in foreign currency.

Enrichment

Another issue pertains to the strategy adopted by Brazil in relation to the enrichment of uranium, in which once again the disinformation of the critics of the Brazilian nuclear program and the bad faith of some of their positions are manifest.

The government's strategy, of which NUCLEBRAS is the simple executor, was widely publicized from the moment of the signing of the agreement with the FRG. In view of the impossibility of access to ultracentrifugal technology really available in the FRG for unrestricted transfer was that of the centrifugal jet.

The arrangement negotiated envisages German participation in the construction of a demonstration plant in Brazil and Brazilian participation in the development of the process in the FRG. That arrangement puts the country in quite an advantageous position because of the possibility of producing enriched uranium in Brazil as soon as the demonstration plant begins to operate and of continually incorporating the new technological advances of the process.

Two objectives were sought with the isotopic enrichment program: the first is fundamental, the guarantee of supply through the establishment in Brazil of a uranium enrichment capacity independent of foreign supplies subject to political conditions; the second, the possibility of achieving a competitive process.

The assessments of the technology known at the time of the agreement convinced us that the "jet nozzle" process was fully feasible from a technical viewpoint. The progress achieved in the reasearch and development programs, however, open up to us the prospect of achieving a process that is also economically competitive.

The Adversaries Create Doubts About Our Determination

With the progress achieved in the process, components and materials areas, very certain prospects open up for us to begin commercial production in January 1986 and to be able to have a production of at least 300 tons of UTS per year beginning in 1987, enough to supply three power plants the size of Angra-II.

The criticism regarding the unfeasibility of the process, whether in technical terms of production, in terms of economic competitiveness, or in terms of the German participation in investments, is completely unfounded and untimely because it is unrealistic and premature.

The suggestion that Brazil could develop the ultracentrifugal technology by itself reveals a profound unfamiliarity with not only the problems pertaining to the process but also those of project engineering, of manufacture and especially of the materials involved in a technology of that sophistication. Suffice it to recall that although the United States mastered the ultracentifugal process during World War II, when it resumed its development in 1955, notwithstanding its immense scientific, technological and industrial resources, it took 20 years to begin the project of building a commercial plant.

Unlike pure scientific knowledge, technology is perishable goods and only its real and constant exercise can maintain it it condition for permanent use. For that reason, therefore, it is imperative to maintain an adequate pace in the nuclear power plant program, coordinating technical and economic factors.

Since nuclear technology is a key technology, the relationship between project engineering, ordering, manufacture and assembly is very close, with those stages having a degree of interdependence not achieved in other experiences. Without a very adequate form of overall management, experience shows that the enterprise will be sacrificed at some point: either in its cost, its schedule, or the establishment of technology and the promotion of national industry.

Thus, the importance of management model for the construction of nucleoelectric plants that will resolve those questions in an appropriate manner. In that connection, President Joao Figueiredo signed a decree-law giving NUCLEBRAS exclusive responsibility for the construction of nuclear power plants, and a decree that authorizes NUCLEBRAS to establish a subsidiary for that purpose named the NUCLEBRAS Nuclear Power Plant Building Corporation (NUCON).

The decree-law provides that NUCLEBRAS will always hold 51 percent of the stock with voting right, and assures the participation in the voting capital by the electric service concessionaires, proprietors and future operators of nuclear power plants.

The capital will also be open for private companies with a majority of national capital that become engaged in the power station building program as suppliers of services and equipment.

On the basis of the experience acquired in Angra-I, II, and III, in their different phases, the management model defined in the decrees signed by the president, by concentrating responsibility, seeks through standardization to facilitate establishment of the technology transferred in the context of the Brazilian-German agreement. This establishment will occur in terms of the project, construction management and commissioning of the nuclear power plants, as well as the manufacture of equipment and construction and assembly engineering in charge of national private companies.

In relation to the electric service concessionaires authorized to build and operate nucleoelectric plants, NUCON will assume the responsibility to supply, in the form of an overall contract, all services and equipment necessary for the establishment of a nuclear power plant. And it will do so with a guarantee of time schedule and price, which will represent a landmark in the implementation of major projects in the country.

With reference to nonreplenishable energy reserves, the uranium reserve is the largest in the country, even considering only the present thermal reactors. Taking the fast-breeder reactors into account, those reserves, in equivalent kilocalories, are 70 times greater than the total reserves of coal, oil, natural gas and shale. Therefore, it is well to ask why should we deny ourselves or delay the utilization of that huge potential, in the context of the policy of the mobilization of national resources and of energy independence that Brazil adopted?

What is really under discussion is the larger question of the need Brazil has to resort immediately to nuclear energy, a need that internationally justifies the country's access to possession of national enrichment and reprocessing plants. In that connection, it is essential to pay close attention to arguments supposedly in favor of an undefined nuclear program but which casts doubt on the pace of the present program. The questions of the size and pace of the program are closely related to the feasibility of the process of the transfer of technology in terms of establishing the technology transferred.

What the adversaries of the Brazilian program seek is really to undermine the economic bases of the program in order to create doubts abroad with regard to the peaceful intentions of our nuclear policy or doubts regarding our determination and our capability to carry it out.

The correctness and timeliness of the government decision, in my opinion, cannot and should not be put in doubt by small and circumstantial imperfections that have occurred in some phases of a complex process of implementation. And there is all the more reason not to proceed in that manner when one takes into account the adverse conditions that the implementation of the Brazilian nuclear program continually has to overcome on the foreign and domestic levels. However, we desire honest and objective criticism exercised through open and democratic processes as a permanent instrument to oversee our actions and improve our performance.

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PRESS REPORTAGE ON HIGH COST OF NUCLEAR PROGRAM

More Than Agriculture

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 3 Dec 80 p 24

[Text] The budget proposal that is being studied in the Ministry of Mines and Energy envisages the investment of 114 billion cruzeiros in 1981 alone for the Brazilian nuclear program projects, which represents 28.7 percent of the total funds the government plans to allocate to the Brazilian Electric Power Company (ELETROBRAS).

That is, despite the statements of Paulo Nogueira Batista that the nuclear program will not absorb more than 15 percent of the funds in the energy sector, his budget proposal represents much more. Basically, what must be happening is a comparison between what the nuclear program is going to spend, with all of the investments in the overall energy sector (not only electric energy).

What is most surprising in that whole situation is the fact that the Brazilian Nuclear Corporation (NUCLEBRAS) is asking for 51 billion cruzeiros in the 1981 budget for its own activities, among which are included the NUCLEBRAS Heavy Equipment Corporation (NUCLEP) and--astonishingly--the beginning of construction of the fourth nuclear plant in Sao Paulo, when the problems of the Angra-II foundation have not yet been solved and the definite site of Angra-III is not even known precisely.

But in the haste to make the nuclear program irreversible, the company already plans to begin construction on the fourth nuclear power plant. At the same time, Furnas will have to invest 63 billion cruzeiros in 1981 to proceed with the work on Angra-II and to begin Angra-III. All together, investments in the order of $1.8 billion will be made in the nuclear sector in only 1 year.

At the present time, the proposal is in the hands of Minister Cesar Cals, who must make an urgent decision. It is unlikely that he can cut the nuclear program, which is considered a priority matter by certain high government levels. Thus, other more urgent projects in the electric energy sector will have to be delayed.

Coincidentally, on the same day that NUCLEBRAS' plans were revealed--114 billion cruzeiros to be invested in 1 year--the minister of agriculture announced that he already had an investment program for that vital sector of the Brazilian economy:

it will be necessary to invest $68 billion in 5 years to take care of the domestic demand for food; to increase the planted area by 2.5 million hectares, 1.8 million of which to implement and try to develop the current goals of the Proalcool program. That is, if approved as it was proposed by NUCLEBRAS, the nuclear program is going to absorb in only 1 year almost double all the funds envisaged for Brazilian agriculture in 5 years!

One may ask: after all, which has the higher priority? And besides, will that amount be enough to at least get the three nuclear plants off the ground? After all, they are funds intended only to proceed with one plant and to begin two others simultaneously, and there are still five more according to the agreement signed with Germany. Will there be sufficient funds for all those projects plus Carajas, which is vital for the Brazilian economy as the generator of foreign exchange, plus the Steel Railroad, plus taking care of the starving Northeast?

'Cost Does Not Matter'

Sao Paulo FOLHA DE SAO PAULO in Portuguese 30 Nov 80 p 46

[Text] Brasilia--"The reaction against the Brazilian nuclear program occurred because they wanted the dependence we have in the oil sector to be transferred to the nuclear sector.

"Thus, our dependence would only change masters, passing from the Persian Gulf to countries such as the United States and Canada. But the Brazilian nuclear program is the result of an international agreement with Germany, a commitment that Brazil is going to honor because we are convinced that the future of energy in the world is nuclear energy and that future will belong to whoever has the energy and not to whoever is going to import it."

That emphatic statement was made yesterday by the secretary general of the Ministry of Mines and Energy (MME), Arnaldo Barbalho, who, representing Minister Cesar Cals, who is in Colombia, made a presentation of Brazilian energy policy in the energy policy committee of the Social Democratic Party (PDS). Although 62 persons had been slated to attend only 15 showed up at the meeting, during which the presiding chairman, Deputy Vasco Neto, declared: "On the decisions that are taken on energy policy will depend the survival of the PDS."

After a 20 minute presentation, the secretary general of the MME pointed out that "all current Brazilian energy policy rests on the premise of achieving energy self-sufficiency in the medium term, preceded by a gradually decreasing dependence in the short term." He considered that in Brazil, the problem of energy self-sufficiency is simply one of financial resources "because we do not have the amount necessary for the immediate mobilization of national energy resources."

Referring to those who fight the nuclear program on the basis of its high costs. Barbalho declared that Brazil has to develop nuclear energy not in terms of its cost but because it will be necessary in the future, because "it will give us nuclear capability to develop the other technologies that will come."

Funds for Fourth Plant

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 2 Dec 80 p 30

[Text] The budget proposal of the Brazilian Nuclear Corporation (NUCLEBRAS) submitted to Minister Cesar Cals already provides for funds for the fourth nuclear plant that will be built in Sao Paulo. The company's budget calls for 51 billion cruzeiros intended for the fuel cycle program, NUCLEBRAS Heavy Equipment Corporation (NUCLEP) and civil works on the new plant. In the meantime, in Furnas' budget, also submitted to the minister of mines and energy, there is an allocation of 63.7 billion cruzeiros solely for proceeding with work on the Angra-II and III nuclear power plants, including the importation of equipment. That total represents more than 50 percent of Furnas' budget.

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NUCLEBRAS OFFICIAL DEFENDS NUCLEAR AGREEMENT

Rio de Janeiro O GLOBO in Portuguese 26 Nov 80 p 18

[Text] During a lecture in the Engineering Club, the director of mineral resources of the Brazilian Nuclear Corporation (NUCLEBRAS), John Albuquerque Forman, yesterday reiterated that the Brazilian nuclear program is based on the fact that available energy sources, including hydroelectric sources, will be exhausted by the beginning of next century.

He pointed out that Brazilian energy demand is growing faster than anticipated, a fact that occurred mainly after 1972. He explained that in the beginning of the seventies, growth was between 3 and 4 percent per year, increasing to more than 11 percent beginning in 1973. Another lecturer, engineer Eduardo Marques of the National Nuclear Energy Commission (CNEN), presented the same justification for the nuclear problem, arguing that to guarantee the country's economic growth in the next 30 years, it is necessary for the nuclear plants to be implemented immediately.

Criticism

While John Forman and Eudardo Marques dwelt on the historic and descriptive part of the program, engineer David Simon, a former technician with CNEN, declared the construction of nuclear plants "jeopardizes current and future generations."

He said that there is no way to justify the substantial funds already spent and to be spent on nuclear units. In his opinion, nuclear energy will not resolve the oil problem and its cost will always be higher than the other conventional sources. He emphasized that along with the program, the government should at least adopt a social welfare policy, attacking the problems of health, education and sanitation. He emphasized that those areas deserve at least equal treatment.

David Simon said that the nuclear program has received substantial funds, which demonstrates the privileged treatment given it by the government. In the meantime, he stressed, during his recent visit to the Northeast, the president of the republic stated that there is no money to implement the irrigation plan.

According to the lecturer, the program should not only be subjected to a broader discussion by the scientific community but greater participation of society, on which will befall the ecological problems inherent in atomic plants. Speaking about atomic waste, Simon pointed out that, thus far, no country in the world has resolved the problem of atomic waste.

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ANGRA-II PROJECT TO BE ACCELERATED TO MEET SCHEDULE

Rio de Janeiro GAZETA MERCANTIL in Portuguese 15 Dec 80 p 7

[Article by Fernando Pereira in Rio]

[Text] The work on the construction of the second Brazilian nuclear reactor, Angra-II, is going to be accelerated in 1981 in order that the timetable for the implementation of the Brazilian-German nuclear agreement may get back on schedule. Beginning that year, the Brazilian Nuclear Corporation (NUCLEBRAS) plans to invest, in that reactor alone, $250 million in equipment to be produced by national firms such as Cobrasma, Confab and Bardella, industries that already have orders through the NUCLEBRAS Engineering Corporation (NUCLEN), a NUCLEBRAS subsidiary for the engineering area.

Speaking in the Engineering Club, the director of industrial production for NUCLEN, Carlos Syllus Pinto, announced that total participation of national companies in the construction of Angra-II will be raised to 38 percent of the total cost of the project; 35 percent of the funds to be used for purchases from national industries will be spent on sophisticated equipment alone. While the participation of the national equipment industry was restricted to only 8 percent of the project for the construction of Angra-I, over the course of the 20 years for the installation of the eight reactors that comprise the nuclear program, that participation will be 80 percent, on the average. National firms selected to manufacture equipment for the reactors are now receiving orders and consultation from abroad to supply those components. Among the countries that have already signed contracts is Argentina, according to Syllus Pinto. Some of the equipment that must necessarily be purchased in Germany is control valves and large-diameter stainless steel tubing, both components not yet manufactured in Brazil.

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BRAZIL

ANGRA-II EQUIPMENT TO COST 250 MILLION DOLLARS

Rio de Janeiro O GLOBO in Portuguese 4 Dec 80 p 21

[Text] The industrial promotion director of the NUCLEBRAS Engineering Corporation (NUCLEN), Carlos Syllus Martins, said yesterday that the amount envisaged for the orders of equipment for the Angra-II nuclear plant is $250 million, representing 30 percent of total expenditures related to the purchase of equipment.

The orders will be distributed over a period of 6 years, being accelerated next year and reaching their peak the second year. According to him, national participation amounts to 58 percent if other aspects of the project such as civil works and assembly are considered.

Reservations

During the Second Panel on Nuclear Energy promoted by the Engineering Club, the director of Cobrasma, Marcos Xavier da Silveira, after enumerating the investments and the technical preparation made by industry since 1974 to be able to participate more directly in the nuclear program, declared:

"Of the three companies responsible for supplying equipment, thus far only one has received an order. The other is still negotiating and the third did not get anything."

The three companies mentioned are: Cobrasma (which is negotiating), Confab (which was the first one to receive an order) and Bardella (which has not yet received an order).

Physicist Luis Pinguelli Rosa said that the government has recently been changing its arguments in defense of the nuclear agreement, giving greater emphasis to the transfer of technology. But, according to him, the price that is being paid for the technology acquired in the agreement with the Germans is too high, particularly with KWU.

In that connection, he stressed that, on the pretext of paying for technology, the country is paying about $800 million—which represents $320 per kilowatt generated—for the Angra-II and III engineering projects alone.

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ANGRA-I, II RADIOACTIVE WASTE SEEN TO POSE NO THREAT

Rio de Janeiro JORNAL DO BRASIL in Portuguese 15 Dec 80 p 7

[Text] When the Angra-I and Angra-II nuclear plants go into operation, they will release radioactive cesium and cobalt into the waters of the Angra dos Reis Bay, but since the amounts released will be controlled, they will not pose any danger to the population. That statement was made yesterday by Professor Eduardo Pena Frarca, of the Biophysics Institute of the Federal University of Rio de Janeiro (UFRJ), who is studying the behavior of radioactive substances in the environment, financed by the Nuclear Energy Commission.

More than 90 percent of the cobalt released will be retained in the mud at the bottom of the bay in the area near the plants and it will take about 5 and a half years for its radioactivity to be reduced in half. Mussels, which are sold in fish markets, feed on this mud but they do not substantially assimilate the cobalt (less than 1 percent) and there is no danger to the consumer. Cesium, for the most part, will remain in the water, taking 30 years for its radioactivity to be reduced in half, but it, too, does not represent a danger.

Studies

Professor Pena Franch is chief of the radioisotope laboratory of the Biophysics Institute of UFRJ and, financed by the Nuclear Energy Commission, he is studying the behavior of radioactive substances in the environment, especially the elements to be released by the nuclear reactors and by the Poco de Caldas uranium mine, namely cobalt and cesium in Angra, and uranium and radium in Pocos de Caldas. "The studies will be ready before those installations go into operation because there must be strict control of their release and that type of installation cannot be put into operation before we know all of their effects on the environment," he declared.

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GOLDEMBERG SAYS NUCLEAR PROGRAM HAS NO MILITARY AIMS

Rio de Janeiro O GLOBO in Portuguese 17 Dec 80 p 17

[Text] Salvador--After saying that he is convinced that, although oversized, the Brazilian nuclear program does not have military aims, the president of the Brazilian Society for the Progress of Science (SBPC), Jose Goldenberg, declared yesterday that he does not expect the nuclear program to be a major topic of discussion at the next SBPC, scheduled for next year in Salvador.

"It is a subject that has been overly debated and does not have any priority," he said.

According to Goldenberg, the energy issue must be debated from other angles, mainly that of the production of liquid fuels, the country's greatest need.

"That subject will probably burst wide open," he said, "because a large part of the scientists believe that the national problem is one of liquid fuels, only, the solution to which is the Proalcool program, which has been pushed successfully. However alcohol does not replace diesel. Brazil will have to develop an alternative motor fueled by vegetable oils.

Goldenberg, who came to Salvador to make contacts with a view to organizing the coming meeting scheduled for July 1981, announced that as his personal contribution, he will present a paper on the use of natural gas which, in his opinion, "is extraordinarily underutilized in the country's producing areas."

After reiterating the need for the debate on nuclear energy not to absorb discussions at the next meeting, he pointed out that that type of energy only "produces electric energy, consequently it does not take care of the country's greatest need: namely, liquid fuel.

"Nuclear energy," he declared, "is a new form of energy that is surrounded by innumerable problems and controversies and there are many scientists who believe that is not a sufficiently safe form of energy to be launched on a large scale in Brazil. The thing ended up being oversized within the context of Brazilian needs. The nuclear program formulated in 1975 is not justified in 1980 because our hydroelectric reserves are quite sufficient for the country's needs up to the year 2000.

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INSTRUMENTATION FOR RESEARCH REACTORS TO BE BUILT DOMESTICALLY

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 10 Dec 80 p 26

[Text] Rio--Brazil will no longer have to import nuclear instrumentation equipment for its research reactors because a number of prototypes are ready and completed. The license for that equipment may be furnished to the national industrialists for the purpose of producing it on an industrial scale.

That information was given yesterday by the director of the Nuclear Engineering Institute (IEN), Silverio Carlos Belo Lisboa, shortly before the opening of the First Seminar on Nuclear Instrumentation. He added that the IEN reactor was the first one produced completely in this country and its design, of U.S. origin, underwent substantial modifications.

The aim of the IEN, an agency attached to the National Nuclear Energy Commission (CNEN), is to become a center for the disseminiation of research, development and training. At the present time, Belo Lisboa said, the institute is engaged in nine CNEN programs, as follows: basic and applied research; development and competence, development of reactor technology, development of fuel technology, coordination of national nuclear energy policy, techniques for the production and application of radioisotopes, nuclear materials, training of human resources and nuclear safety. The IEN director pointed out that the nine programs are subdivided into 16 projects or activities and that two of those programs are devoted to the technology of reactor development.

At the present time, the institute has 290 technicians, 130 of whom are of an advanced level--engineers, physicist, chemists and others—but its table of organization provides for an ideal staff [illegible] 384 positions. According to Belo Lisboa, the IEN is researching fuel technology in the aspects pertaining to reprocessing, pure and applied chemistry, radiochemistry and nuclear chemistry, Another project deals with chemical enrichment: a laboratory project to verify data and parameters.

The IEN has an appropriation of 90 million cruzeiros this year, which may be doubled in 1981; it does not include personnel expenses. According to Belo Lisboa, this year's funds permitted a considerable reactivation of the institute's activities.

Meeting

The absence of Brazilian scientists at the meeting of the scientific advisory committee to the director general of the International Atomic Energy Agency (IAEA), which began in Buenos Aires yesterday, was explained by the CNEN director of international relations, Helve Monteiro de Castro. He revealed that the director general, Sigvard Eklund, from Sweden, invites scientists to participate in the committee or group in a merely individual and professional capacity without any formal link with the nation to which the expert belongs. The last Brazilian to be a member of that group--for 5 years, up to 1979--was Professor Hervasio Guimaraes de Carvalho, the current chairman of the National Nuclear Energy Commission (CNEN).

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BRIEFS

URANIUM HEXAFLUORIDE PRODUCTION--Beginning in 1985, the Energy and Nuclear Research Institute (IPEN) of Sao PAULO will be producing, in a plant that is beginning to be installed, 20 kilos per hour of UF-6 (uranium hexafluoride), which is one of the stages of the fuel programmed to fuel the reactors of the nuclear plants to be built in Brazil. That information was revealed yesterday by engineer Claudio Rodrigues, one of the directors of IPEN (an agency of the Secretariat of Industry, Commerce and Technology of the state of Sao Paulo), during a discussion session on nuclear energy in Brazil held in the Engineering Club of Rio de Janeiro. [Sao Paulo FOLHA DE SAO PAULO in Portuguese 4 Dec 80 p 23] 8711

URANIUM CONCENTRATE FROM ARGENTINA--Buenos Aires--Argentina will sell the Brazilian Nuclear Corporation (NUCLEBRAS) 240 tons of uranium concentrate under the terms of the cooperation agreement for the development and application of the peaceful use of nuclear energy signed by the two countries. The official announcement of the Argentine Government, released yesterday, indicates its approval of the financing contract between NUCLEBRAS and the National Atomic Energy Commission (CNEA) for the purchase of uranium concentrates. The cooperation agreement between the two countries was signed in Buenos Aires on 17 May of this year by Presidents Joao Figueiredo and Jorge Videla during the Brazilian president's visit to Argentina. [Brasilia CORREIO BRAZILIENESE in Portuguese 10 Dec 80 p 12] 8711

COMMENT ON ARGENTINE AGREEMENT--NUCLEBRAS president Paulo Nogueira Batista said in Buenos Aires yesterday that the nuclear agreement between Argentina and Brazil "will certainly dispel all possible distrust that exists with regard to the national nuclear plans of the two countries." Nogueira Batista also acknowledged that the bilateral agreement in the field of nuclear energy has "put an end to speculation about a supposed rivalry or competition between Argentina and Brazil." (Sao Paulo FOLHA DE SAO PAULO in Portuguese 30 Nov 80 p 10] 8711

CSO: 5100

KUWAIT SCHOLARS DISCUSS NUCLEAR CAPABILITIES OF ARAB COUNTRIES

Kuwait AL-QABAS in Arabic 1, 2 & 4 Nov 80

[A number of Kuwait Scholars Interviewed on Nuclear Energy Issues by Ghazi Jaradah; "Dr 'Abbas Ma'rifi, Professor of Mechanical Engineering at Kuwait University, to AL-QABAS: Arabs Will not Possess Capabilities to Produce Nuclear Weapon Before at Least 10 Years to Come; We Will Face Real Energy Crisis Unless We Barter Oil for Nuclear Technology; Nuclear Plants Are Only Alternative to Oil in Energy Production; Introduction of Nuclear Engineering Course at Kuwait University; Kuwaiti-Saudi Nuclear Cooperation Program Stopped; Need to Set Up Nuclear Plant for Peaceful Purposes in Kuwait; Dr 'Adnan Mustafa, OAPEC Assistant Secretary General, Asserts: Arabs Possess 6 Million Tons of Uranium; Algeria Capable of Becoming Regional Center for Arab Nuclear Fuel Cycle; Arab Financing Circles Urged to Invest in Uranium; Dr 'Abd-al-Rasul al-Nasir, Professor of Physics at Kuwait University: Arab Production of Atomic Bomb Is Still Far Away; Need to Establish Joint Arab Center for Nuclear Research; Embarking on Nuclear Industry Requires Production of Nuclear Fuel Which Is Available to Us"]

[1 Nov 80 p 6]

[Excerpts] The talk about the Arab nuclear capabilities is ceaseless and ever-present. Nuclear energy is the language of the age, both in peace and in war. Moreover, what is being said about Israel's possession of nuclear weapons requires the Arabs to exert serious efforts to acquire this weapon in order to establish the Arab-Israeli balance of powers.

AL-QABAS has presented this issue at more than one level recently through its publication of a summary on the book "Weaponry" by British journalist (Russel Darren), through an interview with Dr Ibrahim Hammudah, chairman of the Egyptian Nuclear Energy Authority, who has pointed out that the Arabs are humanly and technically capable of producing the atomic bomb and then through an interview with Lt Gen 'Abd-al-Halim Abu-Ghazalah, the Egyptian chief of staff, and the interview with Maj Gen Mustafa Talas, the Syrian minister of defense.

AL-QABAS completes the various aspects of this vital issue with a series of interviews with scientists and scholars in Kuwait specialized in this field. AL-QABAS interviews today Dr 'Abbas Muhammad Rafi' Ma'rifi, the professor of mechanical engineering at Kuwait University and member of the Kuwaiti Committee for the Use of Nuclear Energy for Peaceful Purposes.

Arab Nuclear Capabilities

Dr 'Abbas Ma'rifi believes that the Arabs do not possess at present and will not possess for 10 years to come the capabilities to produce an atomic bomb. He has added that some Arab countries, such as Egypt, Iraq and Algeria, have adopted expanded programs for the use of nuclear energy for peaceful purposes. But these programs are still modest and have not yet reached the level of producing electric energy through the use of nuclear reactors. Dr Ma'rifi has pointed out that these programs are confined at present to conducting scientific research for the development of work in the spheres of health, agriculture and food and that the reactors owned by some Arab countries are research reactors.

Dr Ma'rifi expects Iraq to be the first Arab country to use nuclear energy to generate electricity by virtue of the fact that Iraq's program is under implementation at present. He also expects Egypt and Algeria to join in this sphere and that they will be perhaps followed by other Arab countries in the next 20 years.

He has added that production of the atomic bomb is linked to the possession of nuclear reactors which can transform ordinary nuclear fuel into strongly concentrated [enriched] fuel that can be used in manufacturing the atomic bomb for military purposes.

Dr Ma'rifi has also pointed out that the other Arab countries do not have nuclear research centers and that this makes it necessary to encourage the foundation of centers seeking to develop the nuclear energy and to encourage the development of scientific cadres capable of operating such centers and, consequently, of adopting programs for the use of nuclear reactors to generate electric power by the conventional means that consume a lot of oil and gas, especially since the Arab homeland is on the threshold of big energy consumption in the future and the threshold of an industrial and social leap that will need vast energy. It is certain that the current conventional resources will not be adequate for this leap.

Dr Ma'rifi has urged the Arabs to enter the nuclear sphere and has stressed their need to implement programs in this sphere in the next 10 years at the most.

He has also stressed the need to introduce the various disciplines of the nuclear sciences into the Arab universities. He has urged Kuwait University to set up a nuclear energy research center, to adopt a nuclear program for peaceful purposes and to exert efforts to design, build and operate in Kuwait a nuclear reactor for power generation and for water desalination, in addition to setting up a nuclear plant to serve these goals.

We Will Consume One Half of Our Oil

Speaking about the importance of introducing nuclear energy to the Arab homeland generally and to Kuwait in particular, Dr Ma'rifi said:

The concept of introducing nuclear energy into the Arab homeland is linked to the issue of increased oil prices and increased energy consumption, considering that we burn vast quantities of oil and gas to generate the energy that we consume daily. There will come a day when we will consume about 50 percent of the oil we produce for the generation of power. Shaykh 'Ali Khalifah al-Sabah, the minister of oil, has stated that before the year 2000, Kuwait will consume one half its oil production to produce its energy needs if we continue to rely on the generation of power by the usual means that are employed at present and that depend on gas and oil, especially since gas production is tied to oil production. This will create a major energy crisis in Kuwait and will, consequently, deprive us of the national income on which the country relies.

If we look around us and wonder about the alternatives, we can assert that solar energy is economically unfeasible at present for the production of our energy needs, even though God has blessed us with enormous doses of the sun and even though the Kuwait Scientific Research Institute is exerting efforts to develop the production of solar energy. However, the development and employment of this energy require a long time.

Only Alternative

The only alternative is to rely on nuclear plants in energy production and water desalination. This is due to the fact that the production cost per kilowatt is relatively low when compared to the conventional plants that use gas and oil.

Kuwait is not the only country suffering from an energy crisis. The entire Arab homeland suffers from this problem. At present, the only immediate and economical alternative to the conventional methods is the use of nuclear reactors to generate electric power.

Cooperation Produces Best Results

Regarding the Arab nuclear capabilities, Dr Ma'rifi has said:

There are several Arab programs in this sphere. There are national programs, bilateral programs, regional programs and semi-regional programs. But these programs are not under implementation and are still the subject of discussion. In every country, there are ideas and some programmed applications of such ideas. There was an idea in the early 1970's for Kuwaiti-Saudi cooperation on the use of the atom for peaceful purposes, such as the construction of a nuclear plant to supply both Kuwait and Saudi Arabia with electricity and desalinated water. However, this program has not been carried out yet. If implemented, both countries, and perhaps the Arab Gulf states generally, will benefit from this program.

Small Research Centers

The idea of introducing nuclear technology into the Arab homeland is still short of the limit of sufficiency and of effective production to meet the Arab homeland's needs in this sphere. The national efforts exerted by most of the Arab countries are still limited. There are countries, such as Iraq, Egypt and Algeria, that have adopted expanded programs for the use of [nuclear] energy for peaceful purposes. But these programs have not yet reached the limit of generating electric power from nuclear reactors. The production is still relatively small and is only used for simple purposes, such as medicine and scientific research. Many of the research centers in the Arab countries concerned with the use of nuclear energy for peaceful purposes focus their efforts on scientific research and on developing works in the spheres of agriculture, medicine and food.

Dr Ma'rifi has also pointed out that some Arab countries, including Kuwait, do not have nuclear research centers. This makes it necessary to encourage the establishment of centers seeking to develop this energy and to encourage the scientific cadres to conduct their research in the countries concerned, especially since Kuwait needs trained technical cadres to carry out the program for the introduction of nuclear energy and since this technology needs scarce specializations.

Teaching Nuclear Engineering

Answering a question on whether efforts are made in this regard by the University of Kuwait, the Kuwait Scientific Research Institute or the Kuwaiti Scientific Progress Organization, Dr Ma'rifi said:

There is a joint program among these circles to set up a nuclear center for the development of nuclear energy locally and for the purchase of a nuclear reactor. This is something that is being discussed by these organizations at present.

As to whether the University of Kuwait teaches the nuclear engineering discipline to its students, Dr Ma'rifi has said that so far there are no courses of the sort at the university, adding that the Engineering College may introduce in the second academic semester the "nuclear reactors engineering" course which will be optional at the outset for the students of mechanical, electrical and chemical engineering.

Dr Ma'rifi has pointed out that such courses are taught in Egypt for the graduation of nuclear engineers.

Programs Under Consideration

At the Arab level, Dr Ma'rifi has said that consideration is being given to developing the nuclear capabilities and to implementing specific programs. But these may take 10 years at least because any program for the construction of nuclear reactors, beginning with the phase of blueprinting and construction and ending with the phase of operation, requires such a period at least.

He has added that nuclear reactors need nuclear fuel for their operation. Even though the raw materials for this fuel are found in some parts of the Arab homeland, such as Morocco, Saudi Arabia and Algeria, the fuel is not yet produced in the Arab homeland.

This fuel is burnt to generate energy. The enriched fuel--uranium 235--burns by no than 3.5 percent and is fissionable. What remains after the burning is uranium 238 which is not fissionable and which turns into fissionable fuel--plutonium 239--in the reactor. The isotope uranium 235 splits through reaction with a neutron, thus generating energy. The nuclear fuel is in the form of belts and the progressive reaction is controlled by special rods that absorb the excess neutrons. The energy is then used for various purposes, such as the generation of power, through passing water or (non-oil) gas to extract the energy latent in the reactor and to cool the center of the nuclear reactor which becomes heated as a result of the heat generated by the progressive nuclear reaction.

Bartering Oil for Nuclear Technology

Dr Ma'rifi has urged the rich developing countries to barter oil for the transfer of nuclear technology and to invest their vast monies in the nuclear industries so that they may have a heard voice as a result of their entry into the nuclear club. In particular, Dr Ma'rifi has urged Kuwait to invest its monies--a large part of its foreign investments, to be specific--in industries connected with the nuclear fuel, such as investing in uranium mines, an industry monopolized by foreign firms, because it is essential to supply nuclear fuel to any reactor and because without such fuel, the construction of any nuclear plant will be tantamount to a dead and worthless investment economically due to the foreign monopolies.

Nuclear Plant in Kuwait

Dr Ma'rifi added: We wish that Kuwait would build a nuclear plant that can produce 15 to 20 percent of the country's total electricity consumption, thus reducing the risks and obstacles of complete dependence on imported [nuclear] fuel.

He has pointed out that there was a plan for the construction in Kuwait of a nuclear plant with a capacity of 40 megawatts to produce both electricity and [desalinated] water but that the plan has not been implemented due to the high cost of this plant and due to its economic unfeasibility. The decision to cancel the plan was wise at the time.

But it is necessary now to embark on a study for the introduction of nuclear energy to Kuwait and the Arab world generally as a result of the high oil and gas prices.

Age of Nuclear Industry

Regarding the future of the nuclear industry in the Arab homeland, Dr Ma'rifi has said: We are in a big and dire need to embark on this industry because of our development in the entire Arab homeland. We have not yet attained the required industrial level. We are on the threshold of an industrial and social leap and there is no doubt that we will need vast amounts of energy which we will not be able to supply with the conventional resources used at present. We must enter the world of the nuclear energy, else time will beat us and we will face an enormous energy crisis in the coming years. In the future, Iraq is expected to be the first Arab country to use nuclear energy in generating electricity because Iraq has a program under implementation at present.

As for the other Arab countries, I expect Egypt and Algeria to join in this sphere and to be followed by other Arab countries. I wish that Kuwait would enter this sphere quickly and would draw up a specific program, like some other Arab countries, to be implemented in the future.

[2 Nov 80 p 6]

[Excerpts] AL-QABAS continues today its interviews with the specialists in Kuwait on the Arab nuclear capabilities. AL-QABAS interviewed yesterday Dr 'Abbas Ma'rifi, the professor of mechanical engineering at the University of Kuwait and member of the Kuwaiti Committee for the Use of Nuclear Energy for Peaceful Purposes. The paper interviews today Dr 'Adnan Mustafa, the OAPEC [Organization of Arab Petroleum

Exporting Countries] assistant secretary general, the executive secretary of the Arab Physics Society and a former minister of oil in Syria.

Dr 'Adnan Mustafa has asserted that the Arab experiment to master and develop the nuclear technology is still at its start. He has also said that the Arab scientists and nuclear technologists must realize their aspirations to create the nuclear industry within a period not exceeding the second half of the 1980's.

Dr Mustafa has also said that the Arab endeavors in this sphere have not met success due to lack of control over the phases of this industry.

Dr Mustafa has urged that the Arabs begin production of the uranium which is available in the Arab lands in combination with other substances, the most important being phosphate.

He has said that Algeria is qualified to be a regional Arab center for the Arab nuclear fuel cycle because it has adopted action that suits it and suits the Arabs, relying on its intrinsic resources, and has succeeded in building a complete group of various departments concerned with dealing with issues pertaining to the nuclear fuel cycle.

Dr Mustafa has also pointed out that Iraq has begun to implement another distinctive program which will perhaps constitute one of the new experiments for producing nuclear energy in the future.

On the other hand, Dr Mustafa has demanded that the issue of uranium production and processing be raised among the Arab financing circles.

Only Alternative to Energy

Speaking about the importance of introducing the nuclear technology to the Arab homeland, Dr Mustafa said:

At present, nuclear energy is considered the only visible and possible alternative to the conventional energy sources capable of meeting the energy needs of the economic development. This fact has been reinforced as a result of the constant depletion of the oil fuel resources by the advanced countries and as a result of the lack of effective measures taken to preserve these resources that are considered the property of all mankind.

If we add to this the fact that the third world, which contains two-thirds of the world's population, must acquire its legitimate share of these resources at present and in the future, then we understand the need for our embarking on this industry.

But it seems that the tension existing between the private interests of the advanced countries and the basic needs of the developing countries and between the principles of subservience and of clear independence in every aspect of the process of mastering this technology obstructs the progress of the developing countries in this sphere, especially since the advanced countries monopolize these industries. This progress has been poor throughout the 20 years following the elimination of the secrecy engulfing the nuclear energy, i.e. from 1958 and until the present. During this period, the nuclear energy entered a phase of openness followed in the early 1970's by a phase of scrutiny. During these two phases, the process of mastering the nuclear technology--within the advanced countries--underwent reasonable development as a result of the disappearance of the uranium monopoly, of the growth of the trade in nuclear energy installations and as a result of the enriched uranium made available by the United States, in addition to the control which has become one of the main features of any nuclear cooperation between the advanced countries.

Organization for National Nuclear Development

Dr Mustafa added: In the early 1970's, the Arab homeland witnessed the emergence of a new method to acquire the nuclear technology. Each of Algeria, Egypt, Tunisia and Morocco sought to set up long-range progams in this sphere. They discovered a number of major problems that can arise during the phase of mastering the nuclear technology and considered some national measures to solve these problems.

Moreover, the success of some developing countries, such as Brazil, India, Pakistan and Turkey, in starting national nuclear programs has encouraged some Arab countries to show interest in acquiring and mastering the nuclear technology in order that this technology may help them in the future to make available a new and long-lasting source of energy on the one hand and to enable them to introduce, on the other hand, a new means to enhance their technological role--and this is something that will have a strong impact on the entire scientific and industrial progress of these countries. However, the success of a national nuclear program is tied closely to several basic requirements, the most important of which is the presence of a national nuclear development organization because such organizations have proven their usefulness in the developing countries that have entered the field of nuclear activity. Algeria has set up the Nuclear Sciences and Technology Center and Iraq has set up the Nuclear Energy Organization. Libya has set up a similar organization which hasn't started its work yet. All this has been done for the sake of the ideal use of all the nuclear means available in these countries and with the purpose of enhancing national awareness of the nuclear technology on the one hand and of creating the practical national base for this technology on the other hand.

Diverse Arab Policies

Regarding the current nuclear capabilities, Dr Mustafa has said: In view of the fact that the Arab countries are a part of the developing countries, they have not yet been able to establish their nuclear capabilities. The cause of the failure to overcome this situation emanates from the lack of control over the process of mastering and developing the nuclear technology in the proper manner.

For several reasons, the issue of regulating and controlling the process of mastering the technology has been neglected and this has led to widening the technological gap and to the prevalence of technological subservience in the developing countries generally.

Like the other developing countries, the Arabs' awareness of some realities of the age has escalated. Their awareness of the depletable nature of the sources of energy [sic] and gas has opened their eyes to make them search for alternative sources to the conventional energy. This is why a man encounters more than one initial Arab nuclear energy policy, why he is aware of certain actions throughout the Arab homeland and why he distinguishes the common steps that can form the base for building common Arab nuclear action.

Two Methods for Acquiring Nuclear Technology

Dr Mustafa has said that the Arab policies concerning acquisition of the nuclear technology are divided into two kinds:

The first emanates from the need to realize balanced and ever-growing steps toward the absorption and assimilation and then the employment of the successful aspects of the nuclear technology. The phased goal of this approach is focused on creating some parts of the nuclear industry. This is something that has been done with varying degrees of success in each of Algeria, Egypt and Iraq.

By following this difficult course, the three Arab countries have been able to acquire a considerable part of the nuclear technology and this has encouraged their aspirations to enter the crux of the nuclear industry.

The second kind is concerned with the scientific aspects of the nuclear technology. This type of policies focuses on the isotope applications in agriculture, irrigation, medicine, industry and the environment.

Dr Mustafa has pointed out that the countries that have followed the second type of policies are suffering at present from the guilt complex of their staying far from the countries that have followed the first type of policies whereas Israel, the number one enemy of the Arabs, has realized considerable success in nuclear industrialization (nuclear weapons in particular) by adopting the first kind of policies.

Both types of the Arab nuclear policies have been carried out either by specialized establishments or by way of special tasks carried out by the ministries concerned.

At Arab Level

At the Arab level, a number of Arab recommendations and resolutions initiated in the [early] 1970's began to find their way toward revival in Rabat in 1976 in the form of detailed and specific recommendations contained in a comprehensive declaration issued by the CASTARAB conference. Perhaps the most outstanding of those recommendations was the recommendation to set up three Arab nuclear centers in the central part of the Arab homeland and in the Arab East and the Arab Maghreb. These centers can devote attention to training, research and development of the nuclear energy. The conference also proposed supplying each center with a nuclear reactor with a capacity of 500 megawatts.

Unique Experiment in Algeria

Speaking about the current capabilities, Dr 'Adnan Mustafa has said that a few Arab countries have recognized the effective role that nuclear energy can play in developing the national economy, namely Algeria, Egypt and Iraq, whereas the other Arab countries have continued to engage in some activities connected with the peaceful aspects of the nuclear technology.

Dr Mustafa has also pointed out that as a result of Iraq's, Egypt's and Algeria's engagement in diverse and advanced industrial activities, they have been able to establish some links with the advanced technology. Consequently, these three countries have become capable of setting up nuclear reactors for the generation of electric power. However, Algeria's experiment to acquire the nuclear technology is considered unique in the Arab homeland because the Algerians are focusing on the independence of uranium resources found in Algeria and on processing these resources to become convenient fuel for any nuclear reactor.

Add to this the fact that Algeria has realized considerable success in absorbing the various aspects of the nuclear reactor industry. The steps realized in this regard confirm that the Algerians are capable of embarking on this industry and, consequently, of manufacturing their own reactors in the near future.

Arab Fuel Cycle Center

Dr 'Adnan Mustafa has further said that Algeria's relatively advanced experiment in the process of extracting nuclear fuel represents a starting point for considering the Algerian Nuclear Sciences and Technology Center a regional Arab center for the nuclear fuel cycle.

The transfer of peaceful nuclear technology has been included seriously in most of the Arab development programs. Thus, outstanding technologies have been established [developed] in agriculture, medicine, industry and the environment. The Regional Middle East Isotopes Center of the Arab Countries has played a significant role in disseminating these technologies in the Arab homeland and in exerting efforts to acquire the peaceful nuclear technology.

Numerous Obstacles Facing Arabs

Concerning the obstacles facing the Arab mastery of the nuclear technology, Dr Mustafa has said: Numerous obstacles face the Arabs on this difficult path. The first of these obstacles is the tension existing between the special interests of the advanced countries and the basic needs of the developing countries and between subservience and clear independence in every aspect of the process of mastering the technology, as well as the cost of the technology and the restrictions on its transfer. On the one hand, the advanced countries feel that they should earn appropriate returns for their investments in technological research and development. On the other hand, the developing countries feel that they are paying more than they should for an old technology inadequately supplied to them by the advanced countries. The tension peaks in the case of the transfer of the technology where the feelings turn into feelings of anger. The direct relationship between nuclear energy and nuclear weapons is felt more strongly by the advanced and nuclearly superior countries. Because of this feeling, the advanced countries expect that a hidden threat can be posed to world security from the aspiration of others to achieve self-sufficiency in the nuclear sphere. This feeling has been reflected in ever-increasing restrictions imposed on the transfer process day after day and to the extent that has evoked the wrath of the advanced, but nuclearly underdeveloped, countries, as well as the developing countries. Dr Mustafa has added that with the presence of the almost complete monopolization of the process of uranium enrichment by the nuclearly advanced countries, the other advanced countries lagging behind in the nuclear sphere are experiencing concerns commensurate with the emergence of new restrictions imposed on the uranium enrichment technology.

He added that the Arabs have had no luck in their attempts to acquire the nuclear technology throughout various stages, even though they started their attempts in the

1960's. This failure is completely tied to the degree of openness to the world of nuclear politics, to the extent of the Arab countries' flexibility with the multinational companies on the issue of the factors involved (i.e. the economic, political and social factors) on the one hand and, on the other hand, to the presence of a well-organized national nuclear program, to the availability of certain and independent national financing and to the presence of a national nuclear organization capable of implementing intrinsic initiatives and of drawing up a clear-cut program, in addition to the presence of an advanced auxiliary industrial base.

Dr Mustafa added: The Arab countries face a number of factors that obstruct their acquisition of the nuclear technology. Most of the Arab countries that are relatively advanced in this sphere depend on imported technology and suffer from the lack of a national energy program and from the lack of interest in planning for such a program as a result of the policy of indifference toward the nuclear energy. This makes the Arab endeavors pertaining to nuclear research and development foggy.

Regarding future mastery of the nuclear energy in the Arab homeland, Dr 'Adnan Mustafa said that there are three requirements that must be realized to enhance the process of employing the nuclear technology:

To realize maximum benefit from the mastery process, the scientific and technological manpower in the countries receiving the technology must be able to absorb all the main aspects of the nuclear technology. Moreover, the capacity of this energy must also be appropriate to make it possible to overcome the numerous problems that accompany the use of this technology. The data available in this regard indicates that the Arab homeland possesses limited manpower in this sphere. In the countries interested in nuclear energy, there prevails the conviction that they must quickly urge scientists and technologists to support such national work, to exert efforts to create the supplementary structure for training and to review and develop all the national activities in the sphere of higher education in particular and the sphere of research and development generally.

The degree of the national industry's contribution to establishing the heavy nuclear industry: Here, a scientific environment must be present and this industry must be as large as possible. The countries that have established the beginnings of heavy industries, such as Algeria, Iraq, Egypt and Saudi Arabia, can become capable of meeting this requirement and can enhance their capacity to meet it during this decade.

The public opinion's acceptance of the nuclear question can be considered one of the main issues governing this technology. Nuclear performance, the availability of the nuclear fuel, nuclear safety, nuclear protection criteria and treating nuclear wastes are major issues that are raised by the public opinion in the face of any nuclear program. However, as a result of the world public opinion's conviction that the oil and gas resources will be depleted soon, it became evident in the meetings of the Parliament of the Peoples for Peace which was convened recently in Sofia, Bulgaria, that there is a need to support the international efforts to develop the nuclear energy industry so as to insure, with utmost safety, the availability of nuclear energy throughout the world before the end of this century.

Common Efforts

Dr Mustafa has also pointed out that the adoption by a number of Arab states of a distinctive policy to establish their special national experiment will lead to a big advance in acquiring and developing the Arab nuclear industry. Moreover, we cannot forget the major role that the common Arab effort can play in propelling these private experiments--the experiments of Iraq and Algeria--toward realizing their ambitions. He has also said that the first Arab energy conference which was held in Abu Dhabi last year underlined the need to set up an Arab energy commission to plan for such common Arab efforts and to follow up on the successful Arab experiments, in addition to coordinating the various technological, financial and manpower resources available in the sphere of Arab nuclear action and to channelling these resources toward a single Arab crucible that produces an advanced Arab nuclear experiment.

[4 Nov 80 p 5]

[Excerpts] In the preceding two parts of this report, Dr 'Abbas Ma'rifi, the professor of mechanical engineering at the University of Kuwait, and Dr 'Adnan Mustafa, the OAPEC assistant secretary general, discussed the Arab nuclear capabilities from the technical and manpower aspects. In this interview today, Dr 'Abd-al-Rasul al-Nasir, the professor of physics at the University of Kuwait, asserts that production of the Arab atomic bomb is still unattainable. He has also said that the efforts of some Arab countries in the sphere of energy research are modest, relative and serve strictly scientific purposes and some aspects of healthcare.

Dr al-Nasir has said that production of the atomic bomb requires enormous quantities of nuclear fuel (plutomium 239), vast financial and technological capabilities and huge nuclear reactors. He has pointed out that the two Arab countries that are currently implementing programs in the sphere of nuclear energy do not possess such large reactors that can produce plutonium from uranium 235.

Dr al-Nasir has further said that it is more beneficial not to talk about production of the Arab atomic bomb because this is unattainable and is subject to the foreign monopolies that produce the nuclear reactors and their fuel.

He has urged the Arab countries to follow a scientific course and to set up scientific research centers to train scientists and to acquire special human skills in the various fields of science, pointing out that the Arabs are very backward in this sphere. He has said that investment in the field of science is the best investment.

Dr al-Nasir has also urged the Arabs to begin the production of nuclear fuel which can be produced in large quantities in Algeria, Morocco, Saudi Arabia and other parts of the Arab homeland. He has also urged them to develop the research for entering the sphere of the nuclear industries, even if such research takes a long time. What is important is that we start.

Current Capabilities

Speaking about the Arab capabilities currently available in the nuclear sphere, Dr al-Nasir said:

There are only two countries in the Arab homeland implementing limited programs on the use of nuclear energy for peaceful purposes. Each of Egypt and Iraq have a small research reactor to serve scientific and curative health purposes. These small reactors are not adequate for the production of atomic bombs.

In the future, the capabilities needed to begin large-scale programs of scientific research generally and of nuclear research in particular are available financially. The Arabs can establish a scientific research center concerned with the issue of nuclear energy and with developing a generation of Arab scientists in this sphere--a center similar to the Trieste Center in Italy--in order to give some Arab scientists the opportunity to continue and to develop their research.

Moreover, uranium is available in some Arab countries, such as Algeria, Morocco and Saudi Arabia. Regrettably, the industry concerned with this element which is necessary as a nuclear fuel used in the reactors has not yet been known in the Arab homeland despite the presence of some mines from which uranium can be produced and in which this uranium is mixed with other raw materials, such as phosphate.

Human Element

As for the human element, it can be made available through the dispatch of scholarships for specialization in the nuclear sciences, such as nuclear engineering, nuclear chemistry, nuclear physics and other branches of this science. This element can also be made available through the foundation of a research center or centers in this sphere.

The development of this science must be accompanied by development in the other scientific spheres because the scientific cycle is complete.

Applied Study Is Necessary

It is also necessary that the Arab universities introduce the experimental aspect of teaching this science, considering that the science is taught in some Arab universities, such as the Cairo University and al-Azhar University, but that the discipline has not yet risen to the applied experimental level and that it has been confined to the theoretical aspects so far. Such approach does not develop the human capabilities in this sphere.

If we, the Arabs, start training the cadres for this complex industry, then there is no doubt that we will reach the goal after a while, especially since embarking on this industry requires a long time.

Along with beginning the foundation of a scientific research center or centers, we can also at the same time begin training new cadres in this sceince. We will thus obtain within a short period of our life Arab scientific capabilities, keeping in mind that the implementation of any nuclear program requires no less than 10 years.

Nuclear Fuel Industry

Dr al-Nasir has said that embarking on this [nuclear] industry requires by necessity embarking on the nuclear fuel industry for fear of the monopolies and of changes in political conditions because uranium ores are among the strategic commodities that are subjected to extensive bargaining, and nobody knows tomorrow's circumstances.

Dr al-Nasir has wondered: As long as uranium ores are available in some Arab countries, then why don't these countries start by processing these ores before they purchase nuclear reactors? Nuclear reactors can be purchased but who can guarantee the continued supply of fuel for these reactors? We would do well to process this fuel and to make it available at the Arab level, especially since the raw materials for it are available to us and since we have the money necessary and are capable of meeting the costs of this industry and of purchasing the technology needed to produce uranium. This is a complex process scientifically and technologically. But it will not be difficult if we wish to embark upon it in time. The oil refining industry was nonexistent [in our countries] 20 years ago whereas nearly all the Gulf states possess refineries and have entered into this oil industry. It will be beneficial to us to start embarking upon the nuclear industry now. This industry begins with the production of nuclear fuel.

Need for Investment in Science

Answering a question on the future of the nuclear industry in the Arab homeland, Dr al-Nasir has said:

It don't imagine that there is a future for this industry in the short run, unless our outlook toward science changes. The Arabs have become accustomed to reaping quick benefits from any project whereas the benefits of science are not so because they require time. We are very backward in this sphere. The officials in charge of investments and of education shoulder a large part of this responsibility. This long-term investment [in science] is the best future Arab investment, especially since we are countries that still depend on importation in everything, even in science. It is shameful to continue to depend on foreigners forever to operate our factories at all levels, especially if we want to embark in the future on the production of conventional or nuclear energy--considering that such production is highly technical.

Scientific investment in the form of setting up centers and of spending on such centers is the best thing we can do in this regard because such investment will yield the greatest benefits to scientific research generally and to nuclear research in particular.

We must change our outlook toward the scientific progress occurring around us. We have an outlook but we are incapable of making a positive move on the right path because the Arab mentality in the rich Arab countries looks for quick returns and rapid profits, and this is wrong. This outlook has become a general outlook characterizing all people in these countries, even, unfortunately, at the political leadership level.

Perhaps this is due primarily to a political decision which has its internal dimensions. The domestic policy requires that the foundation of high-level scientific research centers be expedited. It is also necessary to study scientific programs for the next 20 years. This is something on which the scientific establishments can cooperate with the Arab universities in order to graduate cadres in accordance with programs befitting a specific plan.

Where Do We Start?

Regarding the period during which the Arabs can embark on this industry or produce power through the use of nuclear energy, Dr al-Nasir has said: There is no doubt that the process of generating electricity and of acquiring power through the use of nuclear reactors will be possible, if we want, during a relatively short period--

perhaps 5 years--that is if we plan now. The process of designing and constructing a reactor does not require more than 5 years. Then follows the stage of operating the reactor and of acquiring the fuel it needs. The bigger and vaster process is the process of entering the nuclear industry to produce nuclear fuel (uranium 235), i.e. the concentrated [enriched] nuclear fuel. This process requires high technologies and a longer time, perhaps 20 years. As for the production of reactors or of the nuclear core [al-qalb], this process requires perhaps still longer time, that is if we begin now.

Atomic Bomb

Regarding the distance or the difference between the reactor's production of electric power and its production of the atomic bomb, Dr al-Nasir has said:

The fact is that a reactor's waste is the plutomium which enters into the production of the atomic bomb. The countries that manufacture reactors do not permit the countries purchasing such reactors to store the wastes for a long period so that the latter may not acquire [manufacture] atomic bombs. The countries that produce this weapon acquire their plutonium from their own reactors which produce waste in large quantities and which can supply these countries in a short time with vast amounts of the nuclear fuel used for military purposes (plutonium 239).

Dr al-Nasir has also said that the technologies for the production of nuclear weapons, including the atomic bomb, are highly complex and require financial and technological capabilities and a longer time. Our acquiring plutonium does not mean that we can produce the atomic bomb. The acquisition of a nuclear reactor does not mean acquiring plutonium quickly. But it will be beneficial to construct research nuclear reactors in the Arab homeland and to set up research centers along with these reactors in order to develop the cadres needed to serve the Arab homeland in the various spheres of scientific research.

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GOVERNMENT ANNOUNCES LAUNCHING OF NUCLEAR PROGRAM

NC071755 Paris AFP in English 1748 GMT 7 Jan 81

[Text] Paris, 7 Jan (AFP)--The prospect of an "Islamic bomb" loomed larger today when Libya announced it was launching a full-scale nuclear energy program.

Libya is to set up its own atomic energy secretariat and build a nuclear research centre, officials in Tripoli said.

Libya's flirting with nuclear energy goes back to 1973 when it set up an atomic energy commission with the aim, observers believe, of helping Pakistan develop an "Islamic bomb" financed by oil revenues.

But it was not until 1978 that Libya first took steps to develop its own nuclear program. After unsuccessful contacts with France, Canada, Sweden and West Germany, Tripoli finally signed an agreement with the Soviet Union in October 1978 for the provision of a 300-megawatt nuclear power station. Construction of the station has not yet started, observers believe, but the Soviet Union is to provide Libya with a 10 megawatt research reactor some time this year.

In July 1980 Libya also signed an agreement with the International Atomic Energy Agency (IAEA) which is responsible for monitoring nuclear installations.

Meanwhile, Libyan technicians have been sent to Argentina to learn about uranium extraction techniques. Experts doubt whether Libyan territory holds much uranium ore, but observers here noted that announcement of the nuclear expansion program comes a day after Libya's merger with Chad following the civil war in that country. There had been reports of uranium deposits in northern Chad, just to the south of Libya, but experts do not believe there are important deposits there.

But for the time Libya and Islamic countries lack nuclear fuel. Tripoli bought 300 tons of uranium from Niger in 1979. According to well-informed sources the uranium was then shipped to Pakistan.

CSO: 5100

SUDDEN ISRAELI CONCERN OVER NUCLEAR PROLIFERATION DISCUSSED

Damascus TISHRIN in Arabic 18 Nov 80 p 7

[Article by Jubran Kuriyah: "Israeli Talk About Nuclear Weapons and Arab Deterrent Power"]

[Text] In the last few days, several Israeli officials and politicians have made statements on the danger of nuclear weapons in the Middle East, expressing their concern over a possible nuclear arms race in the region.

In their statements, the Israeli officials have not only expressed their fear that nuclear weapons might be added to the arsenals of traditional and modern weapons available to the region's armed forces, but have gone on to propose that the region be declared off limits to nuclear weapons.

This is an undeniably sudden change in the policy of Israel's leaders. No Israeli politician or official has ever before called for a ban on nuclear weapons in the region. Moreover, Israel is one of the few countries which have persistently refused to sign the international agreement to ban the spread of nuclear weapons. To this very moment, Israel's signature is still missing from that agreement.

A very short time ago, in the heat of the psychological war against Syria, and in support of the reactionary criminal conspiracy within Syria, Israeli rulers and politicians unleashed talk about nuclear weapons. Their threats to Syria included hints about [Israeli possession or possible use of] nuclear weapons. A statement attributed to Moshe Dayan referred to the possible use of nuclear weapons against Syria. At the same time, a passage from an Israeli book about the October war was published in which the author mentioned that the commander of the defeated Israeli forces in the Golan Heights in 1973 called for using nuclear weapons against Syria. The author said that they were not used because of a political decision.

A few months ago, newspapers in the United States and other Western countries reported that Israel had carried out a nuclear test in cooperation with the racist fascist regime in South Africa. Information and documents confirm that there is cooperation between the two racist regimes in nuclear research, and that Israel obtains uranium from South Africa.

A short time ago, Israeli propaganda was touting to the world press a story about the theft of a European ship carrying uranium supplies necessary for producing nuclear weapons. The purpose of this story was to spread misinformation about the power of Israeli intelligence and Israel's long arm.

All parties concerned with events in the Middle East and the dangers with which they are fraught possess clippings from American, German, French and even Israeli newspapers on the subject of the number of nuclear bombs Israel has produced.

It is no secret that in the 1950's, Israel built its first nuclear reactor in Dimona in cooperation with France, and that several foreign and Israeli experts have been and are still engaged in nuclear research at the Weizmann Institute and at other Israeli institutions. Furthermore, Israel has refused to allow the United Nations to inspect Israeli nuclear reactors.

Until now, nuclear weapons have been a part of Israeli planning, which is based on the use of force and military superiority, on the imposition of faits accomplis by force of arms, and on rejection of UN resolutions on the strength of military superiority ensured by the United States.

On the basis of these facts, it is clear that Israel's rulers are the ones who have introduced the spector of nuclear weapons into the Middle East. These rulers have not hesitated to violate every international charter, treaty and agreement. They have hesitated to use naked force in [carrying out] their plans to annihilate the Palestinian Arab people and liquidate their cause, or in pursuing Israeli expansionist designs to dominate the Arab people.

Just as the aggressive expansionist policy of Israel's rulers is responsible for the perpetual threat of war in the Middle East--which is implicitly a threat to world peace--so this policy is also responsible for introducing the prospect of nuclear weapons as a real potential (danger) to the region.

Just as the United States is responsible for Israel's defiance of UN resolutions, and for its occupation of Arab land, it bears the same responsibility for the possibility of Israel's toying with destructive nuclear weapons.

Anyone who reviews the history of Israel's rulers with regard to the arms race, their flirtation with nuclear weapons and their allusions to them in their threats against the Arabs, cannot help but ask: Why this sudden Israeli concern about the possible introduction of nuclear weapons into the Middle East? Why have Israel's rulers, who have not hesitated to commit war crimes and genocide, or violate international charters and treaties, suddenly become advocates of a ban on nuclear weapons in the region?

Israel's rulers themselves draw a connection between this evident sudden shift and Syria's own strength which is backed up by the support and capabilities provided by the treaty of friendship and cooperation which has been signed by Syria and the Soviet Union.

Syria, which has and continues to call a permanent and just peace in the region on the basis of liberation of all occupied Arab land and a guaranteeing of the immutable national rights of the Palestinian people, has cooperated with all parties which have tried to implement UN resolutions. However, all international efforts that have been made since 1967 have failed in the face of Israeli intransigence and rejection, which are due to the fact that Israel receives modern weapons and has opportunities to obtain highly destructive weapons, from American imperialism.

Among the Arab countries this fact has given strength, credibility and a vital urgency to Syrian statements about the necessity of neutralizing the power of the enemies of peace to use force or the threat of force. Among the peace-loving nations, these Syrian statements have had the power of persuasion.

Under the leadership of President Hafiz al-Asad, Syria has diligently worked to establish strategic parity with Israel in order to bring about circumstances conducive to the establishment of a just and permanent peace and to prevent the aggressors from persisting in their aggressive behavior, intransigence and strident militarism.

Syria has made no secret of the overwhelming importance it attaches to the treaty it signed with its friend, the Soviet Union. The joint communique on President Hafiz al-Asad's visit to the Soviet Union was clear in what it said about strengthening Syria's defense capabilities.

In seeking to establish strategic parity with Israel, provide whatever is necessary to respond to aggression with [appropriate] action and weapons, and transform aggression into a risky venture for the aggressor, Syria is carrying out a clear and fundamental policy proclaimed by President Hafiz al-Asad. It is a policy of striving for a just and permanent peace, of preventing the aggressor from reaping the fruits of his aggression, and of preventing those who defy world opinion from continuing to defy the UN and its resolutions.

It is Israel's rulers who have sought atomic weapons and introduced their potential threat to the Middle East. It is they who will bear all the consequences of this course of action, bearing in mind the fact that Israel is the country least able to endure the results of introducing and using these weapons in the region.

It is no secret that it is Syria's reinforcement and development of its own strength, with the support of the treaty of friendship and cooperation signed with Syria's friend, the Soviet Union, which has induced Israel's leaders to speak about banning nuclear weapons in the region.

President Hafiz al-Asad has proclaimed that Syria will do everything in its power to liberate the occupied Arab land and to guarantee the national rights of the Palestinian people.

The words of the president have always become reality.

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BRIEFS

NUCLEAR POWER IN 10 YEARS--Concerning present uses for nuclear power in the Emirates and the possibility of building a plant to generate electricity with nuclear power, energy expert Dr Eino Tonkio said, "During my visit to some of the country's organizations I have noticed various applications of nuclear energy as well as equipment using atomic materials for medical treatment. I believe that a nuclear power plant can be built here in 10 to 15 years. However, it is necessary to begin preparation now by training cadres, working out a program for training locals in this field, teaching nuclear physics at UAE University, and sending citizens abroad for training. By doing this it will be possible to build a facility in 10 years and the UAE will have a generation of technicians capable of dealing with this technology." If we begin now teaching the basic principles of this field at UAE University, in 5 years the students will know the basics of nuclear physics and in another 5 years they may become professionals in the field. Energy expert Dr Tonkio, of the International Atomic Energy Agency, added, "I believe the UAE has chosen an appropirate time to consider nuclear power, that is, 10 years before a nuclear power plant is needed. During these 10 years some of the other applications of nuclear energy should be employed so that people can become accustomed to it and the use of nuclear energy to generate power will be something ordinary for them." [Excerpt] [Abu Dhabi AL-ITTIHAD in Arabic 12 Dec 80 p 3]

CSO: 5100

ALL FOUR OF COUNTRY'S TROUBLE-PLAGUED NUCLEAR PLANTS BACK ON LINE

Helsinki HELSINGIN SANOMAT in Finnish 11 Dec 80 p 12

[Text] Loviisa (HS) If all goes according to the plans by the power companies, all the four Finnish nuclear power plants will be producing nuclear electricity for Christmas.

Both Imatran Voima and Teollisuuden Voima Oy have announced that the problems which have hampered production are about to be solved.

It is estimated that the 660 megawatt plants at Olkiluoto will produce a total of 7 terawatt hours next year and the 440 megawatt plants in Loviisa a total of 5 terawatt hours of electricity next year.

Attainment of full-scale production of electricity means that nuclear electricity consumption will go up to at least 25-30 percent of the total.

Director Kalevi Numminen from Imatran Voima states: "The full-scale use of nuclear power plants will also increase the reserves of electric production up to 30 percent. The optimal reserve has been set at 25 percent, which means that there will be an excess of 5 percent." Numminen says, however, that as the yearly consumption growth is about 5 percent, the reserve quantity will again be optimal in a year's time.

Power Plants Continue to Have Difficulties

The Finnish power plants are having problems even now. In Olkiluoto, TVO [Teollisuuden Voima] 1 has been shut down since Sunday because of corroded pipes. According to the power plant chief, Raimo Aaltonen, the intention was to get production started on Wednesday.

In the Loviisa 1 power plant, the long-lasting maintenance break continues. Operation chief Anders Palmgren said on Wednesday that it will be possible to start production of electricity in the plant in about a week if the start-up, as yet still not commenced, proceeds smoothly.

Teollisuuden Voima's 2d power plant is now being tested and produces electricity at 100 percent capacity. The test run will be completed in a month.

According to Imatran Voima, the 2d Loviisa power plant's test operation has proceeded well. It was synchronized with the electric network early last month. On Wednesday, it was feeding the system with 320 megawatts of electricity, which amounts to 75 percent of its capacity.

Rotor defects in the electric generators have been the principal problem for the Teollisuuden Voimar power plants so far.

Loviisa 1 of Imatran Voima has been shut down since the middle of May. The condition of the boilers and main valves has been causing problems. The starting of Loviisa 2 was delayed 3 years from the original schedule because of surface problems of the pressure tanks.

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AREA NEAR URANIUM PLANT SURPASSES RADIOACTIVITY NORMS

What Happened

Paris LE MONDE in French 20 Dec 80 p 13

[Article by correspondent, M.S.]

[Text] Limoges--The radioactivity rate of certain stretches and streams of water near the uranium mines exploited by the General Nuclear Materials Company north of Limoges exceeds the admissible norms, according to the journal 50 MILLION CONSUMERS, which is published by the National Consumption Institute (INC), in its January issue. On the occasion of the appearance of the publication, Lucien Bouysse, the technical director of the INC, and Frank Clanet, a professor at the Tours Medical School, who conducted the scientific measurements, presented their principal results on Thursday 18 December to the Limoges Press Club.

The measurements, performed over two seasons, in February 1980 and then again during the summer, showed that although the radioactivity rate of the Limoges water supply is "correct," this is far from the case generally: /alpha activity/ [in italics], they stated, was three times higher than the maximum admissible norm in La Crouzille Pond, six times higher in La Gartempe River and 100 times higher in the Vincou.

The readings showed, Professor Clanet indicated, that downstream from the uranium processing stations significant radioactive infiltrations are being produced in the water of the northern slopes of the Ambazac Mountains, and that the infiltration water, after being contaminated through the mines, the decantation basins and the slag heaps, is polluting the ground water.

Responsible Company Answers

Paris LE MONDE in French 23 Dec 80 p 13

[Article by unnamed correspondent: "A Clarification by COGEMA"]

[Text] Challenged by the journal 50 MILLION CONSUMERS (LE MONDE, 20 December) on the excess radioactivity of the water that is brought about by the exploitation of uranium in Haute-Vienne, the General Nuclear Materials Company (COGEMA) recalls in a communique published on 21 December that specialists "pointed out that the water discharged by the COGEMA mines was responsive on every point to the requirements of the regulation in effect."..."Since our water is responsive," COGEMA stated, "to the requisite potability criteria and poses no problems in the area of hygiene, we have indicated, for the purpose of providing unequivocal guarantees on the psychological level, that we would do the necessary work to discharge this water downstream of the Limoges reservoirs."

On the other hand, as far as the sources COGEMA is accused of drying up are concerned, the mining company states that it is taking all necessary precautions to avoid disturbing them. "We cannot state positively," it states, "that nothing can happen. However, after over 30 years of mining exploitation...we can say that a very small number of sources have been dried up, of the thousands that exist in the sector."

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LABOR PARTY WANTS NUCLEAR ARMS PHASED OUT

The Hague ALGEMEEN NEDERLANDS PERSBUREAU in English 9 Dec 80 p 1

[Text] The Hague, December 8--The Labour party today published a 'second version' of its draft election programme, calling for a gradual reduction of Dutch nuclear armament to zero and possible unilateral measures.

Floor leader Joop den Uyl and party chairman Max van den Berg told a press conference here today a second version had become necessary because 6,000 amendments to the first draft had been proposed by party branches.

The final programme will be adopted at a three-day party congress at the end of February.

The new draft says the party has opted for a policy of unilateral measures, if necessary, but in consultation with the NATO allies and the Warsaw Pact countries.

But Mr Van der Berg said the party would operate 'at the edge of NATO membership' and would not hesitate to take unilateral steps to remove nuclear weapons from Dutch soil.

Pioneering Role

He added the Labour party did not intend to place Holland in isolation, but wanted to play a pioneering role and show other countries a way out of the nuclear arms race.

The programme says about the siting of 572 Cruise and Pershing missiles that 'the intention is to arrive gradually at zero missiles,' adding that the ultimate aim is a nuclear-free Europe.

It stresses that this should be a phased effort so as to avoid isolation and exert the greatest possible influence on allies and other countries.

It proposes to take another look at this strategy of 'cautious shedding' after four years to judge its effectiveness.

Nuclear Energy

The Labour programme opts for closure of Holland's two nuclear power stations --at Dodewaard and Borssele--and for stopping Dutch participation in the fast breeding reactor project at Kalkar, West Germany.

It proposes that the country do without nuclear energy for the time being, but keep informed of developments abroad.

Economic Programme

The Labour programme maintains the assumption that world trade will rise by 2.25% for the next four years.

It stresses the need for redistribution of incomes and investment guidance to conserve jobs and create fresh employment.

It says investment should go into jobs, export and reindustrialisation.

It proposes protection of the spending power of the minimum incomes and a reduction of that of higher incomes for the next four years.

Extra economic growth should be used to increase development aid from 1.5 to 2% of national income.

CSO: 5100

PEOPLE'S CAMPAIGN AGAINST NUCLEAR POWER HOLDS CONGRESS

Stockholm DAGENS NYHETER in Swedish 7 Dec 80 p 13

[Article by Ingvar Andersson]

[Text] "Sweden must not provide fuel for the pyre on which mankind will be destroyed."

With that quotation from the 1950's and the campaign against Swedish atomic arms, Swedish disarmament expert Inga Thorsson called on the People's Campaign Against Nuclear Power to continue its opposition to nuclear power.

The recommendation was made at the national conference of the People's Campaign which opened in Stockholm Saturday.

"Peaceful nuclear power has a clear connection with nuclear weapons," said Inga Thorsson. "Therefore it is necessary to combat the use of nuclear power both in Sweden and around the world."

Acute Stage

The most important thing in Sweden is to prevent the expansion here of the whole nuclear fuel cycle--uranium mining, enrichment and processing, Inga Thorsson said.

"We have reached an acute stage with regard to uranium mining," said Inga Thorsson. "The government has already received requests to mine in Arjeplog.

"We put a stop to nuclear weapons in Sweden 20 years ago with the argument that we should not contribute to the destruction of mankind. Now we risk that the alternate route of nuclear power will provide that contribution anyway."

Inga Thorsson said there is a clear link between civil nuclear power and nuclear weapons.

"Anyone who looks into this issue realizes that."

In Secret

Inga Thorsson said in the speech that civil nuclear power is the simplest way for a nation to acquire nuclear weapons.

"Going directly into nuclear weapons is expensive and difficult. Via civil nuclear power it can be accomplished in secret without anyone noticing it.

"The international controls intended to prevent civil nuclear power from being used for nuclear arms are inadequate for the countries which decide on nuclear weapons. In addition many countries refuse to subject themselves to the controls.

"Several of them--Pakistan, India, Israel, Brazil, South Africa and others--have the technical ability to acquire nuclear weapons with the help of civil nuclear power.

"Since nuclear energy was discovered its civil and military use has spread over the world.

"We are living very dangerously," Inga Thorsson warned. "We are sitting on a powder keg and no one knows when it will explode."

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ANTINUCLEAR POWER GROUP ELECTS NEW CHAIRMAN AT CONGRESS

Stockholm DAGENS NYHETER in Swedish 8 Dec 80 p 12

[Article by Anders Ohman]

[Text] He started his environmental fight by stopping a poorly-located garbage station in Borlange--now he will head the continued fight against nuclear power in Sweden.

This refers to Lars Lindskog, a 43-year-old radiation protection engineer from Borlange, who was elected chairman of the People's Campaign Against Nuclear Power on Sunday.

"The People's Campaign will go on working. First we must activate all the groups around the country."

So said Lars Lindskog, newly-elected chairman of the People's Campaign. He is an experienced environmentalist. He began in the early 1970's by stopping a poorly-located garbage station in Borlange. He helped form the local party, Tunabygden's Friends of the Environment, which has two seats on the city council. Lars Lindskog's wife Ingegerd has one of these seats.

When an environmental group was formed in Borlange 2 years ago Lars Lindskog became chairman. During the period up to the popular referendum he headed the Alternative 3 campaign in Dalarna.

Lars Lindskog is a radiation protection engineer and district head of the county council's purchasing center in Borlange.

One of his first tasks will be to restore order to the admittedly poor economy of the People's Campaign.

"I have never doubted that we can collect the money we need," Lars Lindskog said.

The political parties involved in the Alternative 3 campaign have promised to come up with a million kronor. The approximately 20,000 members of the People's Campaign will have to scrape together the second million.

It is suggested that each member pay 200 kronor. The sale of books, such as Asa Moberg's journal from the People's Campaign, "How the 1980's Began," should provide some money.

Lars Lindskog has strong support within the People's Campaign, not least from resigning chairman Lennart Dahleus who will remain on the steering committee for the upcoming period of office.

"I meet most of the requirements that were set. I am politically unaffiliated and I am not involved in any other organization. I have worked on environmental jobs for several years and have made quite a few contacts. But without the strong support the committee gave me I would never have accepted the chairmanship," said Lars Lindskog who is glad to talk about what the People's Campaign will do in the 1980's.

"We are now linking nuclear power and the proliferation of nuclear weapons. This is a natural thing to do. The export of nuclear power contributes to the proliferation of nuclear weapons around the world."

The People's Campaign also wants to put a stop to test drilling in the mountains of Sweden as a preliminary step toward the storage of nuclear waste.

"We understand that countries such as Denmark are ready to buy nuclear power technology from us if we come up with a solution to the waste disposal problem. There is a risk that the more waste we have in Sweden the greater the pressure will be on nuclear power authorities to find a solution. We cannot contribute to such a development," said Lars Lindskog.

The planned hot-water tunnel from the Forsmark nuclear power plant to Stockholm is also undesirable. It would create a dependence on nuclear power in this area.

"But it is also important for us to come up with good alternatives. We must present alternative energy plans in the communities where an interest in such alternatives exists," Lars Lindskog said.

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SWEDEN

BRIEFS

ANTINUCLEAR GROUP LEADERSHIP--Today the People's Campaign will elect its new steering committee, appointing Lars Lindskog from Borlange as successor to Lennart Dahleus in the post of chairman. Others on the 21-member committee include Lars Norberg of Finspang, Inez Backlund of Jarfalla, Paul Rimmerfors of Stockholm, Liselott Hermansson of Orebro, Sture Ring of Solna and Asa Moberg of Malung. [Text] [Stockholm DAGENS NYHETER in Swedish 7 Dec 80 p 13] 6578

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